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The Electrical Stimulation of Denervated Muscle

S. L. Osborne, Ph. D., and F. S. Grodins, M. D.

The value of and the rationale for the use of electrical stimulation in the treatment of denervated muscle are disputed points. Most clinical physical therapists, on the basis of "clinical experience," advocate its use. However, the value of such impressions gained from experience on human subjects is questionable. It is practically impossible to conduct a controlled study of this problem in man. Evidence derived from studies on experimental animals is contradictory. Many of these studies base their conclusions upon an insufficient number of experiments, inadequately controlled. However, the conclusions reached from several well controlled studies are about equally divided for and against the value of electrical muscle stimulation. Some of this evidence will be considered in detail.

Reid[1] in 1841 cut the spinal motor roots supplying the hind legs in four frogs. He stimulated the same side daily for two months with direct current and found that the muscles on the treated side retained their original size and contractility, whereas those of the opposite side atrophied markedly and contracted only feebly. However, Langley[2] has shown that denervated frog muscle does not atrophy. Many workers since have failed to find any change in the excitability or contractility of denervated amphibian muscle. Brown-Sequard[3] cut the sciatic nerves bilaterally in rabbits and stimulated one leg for six weeks. At the end of this time the muscles on the stimulated side were normal, whereas those on the untreated side showed marked atrophy, and their ability to contract to a stimulus was greatly decreased.

Langley and Kato[4] studied the course of atrophy in the gastrocnemius soleus group of the rabbit. The effect of electrical stimulation for four minutes daily was studied in seven animals. The results apparently showed that electric stimulation with condenser discharges delayed atrophy. However, the number of experiments were few, the differences slight, and no adequate controls were included. Hence the results (as the authors themselves stated) are inconclusive. Langley[5] cut the internal and external popliteal nerve bilaterally in one rabbit. He stimulated one side two or three times each day with condenser discharges at the rate of thirty-six per minute. A total of two and one-half hours of stimulation was given daily. In this way, by using prolonged and rigorous stimulation, he hoped to draw conclusions as to whether denervation atrophy actually was due to disuse. However, he found no difference in the weights of the treated and control muscles after twenty-one days.

In 1920, Hartman and Blatz[6] studied the effect of massage and electrical treatment on denervated rabbit muscle. They appear to be among the few investigators who employed a functional rather than an anatomical test for comparing the muscles. The work which the muscle was capable of doing when lifting an optimum load was used as a standard for comparison. The gastrocnemius muscles on one side of a bilaterally sciatic sectioned animal were treated daily with

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direct current stimulation. Twenty-four animals were studied. They produced contractions which varied in different animals from a barely perceptible response to a vigorous response. The frequency of stimulation was usually sixty per minute, and its duration ten minutes daily. They reported no beneficial effects. The authors state that denervation was followed in a few days by the loss of power to contract to galvanic stimulation in both treated and control groups. It is difficult, therefore, to understand how their method of electric stimulation produced contractions except during the first days of the experiment.

Recently, interest in this problem has been revived. Probably the best study is that of Fischer[7]. This author appears to be the first experimental investigator to attempt to adapt the form of electrical stimulation to the changing excitability of the denervated muscle, so as to produce vigorous contractions throughout the course of the experiment. By varying the frequency and duration of stimulus, he was able to produce a tetanic contraction in markedly atrophic muscle. In a well controlled study in rats, he concluded that electrical stimulation retards the loss in excitability and loss in relative dry weight. The best results were obtained when treatment was started *immediately* after denervation. Fischer stimulated the muscles from ten to twenty minutes daily, using a current intensity sufficient to produce a vigorous contraction.

In 1939, Chor, Cleveland, Davenport, Dolkert and Beard[8,9] studied the effect of various procedures, including electrotherapy, on the atrophy of denervated muscle in the monkey. They concluded that electrotherapy was of no value in delaying or preventing atrophy, or in hastening the recovery of the muscle nerve regeneration. They employed direct current stimulation, producing ten contractions daily. Most of their experiments were unilateral denervations. This study appears to have been inadequately controlled for they did not consider variations in the rate of atrophy from animal to animal, neither did they state the number of animals used. Both Fischer[7] and Langley and Hashimoto[5] have shown that this variation could be considerable. In contrast to Fischer, they secured the best results when treatment was initiated four weeks after denervation.

More recently Molander, Sternitz and Asher[10] cut the sciatic nerves bilaterally in eleven dogs. One leg was stimulated with direct current, twice daily, five contractions at each session. After six weeks, the corresponding muscles were removed and weighed. The treated muscles showed as much weight loss as did the controls. However, in six of the nine cases, the control muscles showed slightly more histologic evidence of degeneration. They concluded that electrotherapy was of no value.

On the other hand Kowarschik and Nemec[11], using a special stimulating apparatus for obtaining a current of optimum form, state that electric stimulation is of value in preventing atrophy and restoring muscle function.

Very recently, Liebesny[12] employed an interrupted direct current with variable frequency and pause (Leduc current). In an experiment on one frog he showed that the Leduc current was less fatiguing than the usual interrupted direct current. In one rabbit with paralyzed hind legs, he treated one leg with the Leduc current, and the other leg with the direct current for ten minutes daily, giving 240 contractions. He stated that the direct current was of no value but that the Leduc current was of marked value. These results are suggestive, but the small number of experiments and lack of adequate controls make any far-reaching conclusions unjustifiable. The author states that he has used the Leduc stimulation in 134 poliomyelitis patients and 1000 peripheral nerve injuries with very satisfactory results. The basis for comparison is not apparent.

Gutmann and Guttmann[13] crushed or cut the peroneal nerve, bilaterally, in six rabbits. They stimulated one leg with the direct current daily for fifteen to twenty minutes, securing 500 to 600 contractions; they used the other leg as a control. They concluded that electrical stimulation not only delayed and diminished muscular atrophy but also accelerated the muscle to return to its initial volume. Moreover, the treated muscles exhibited greater electrical excitability than did the controls. Unfortunately, their controls did not include the normal variations from animal to animal and, therefore, are inadequate. However, if the controls of Langley and Hashimoto[5] are used, then the result of Gutmann and Guttmann would appear to be significant.

Solondt and Magladery[14] have reported that stimulation for two minutes, three times daily with a twenty-five cycle sinusoidal current, considerably decreased atrophy, in denervated rat muscle. The number of animals tested is not stated. It is thus apparent that there is no agreement in the experimental literature as to the value of electrical muscle stimulation. However, there are certain general observations which can be made. In general, when daily treatment was given, when the periods of stimulation were relatively long, and when the current strength was sufficient to cause a vigorous muscle contraction,

the results were favorable. The single exception[2] to this generalization is based on the results from a single animal. Without exception, those who have employed weak stimuli or short periods of stimulation report unfavorable results. Again, those who have attempted to adapt their stimuli to the changing excitability of the degenerating muscle have had better results. In spite of this, a recent clinical article[15] advocates the use of weak stimuli insufficient to produce joint movement. The basis for this recommendation is vague.

A great deal of information has been presented in the physiological literature regarding the electrical excitability of muscle, as well as the mechanism by which muscular contractions are graded in strength. Much of this information apparently has been overlooked by those clinicians interested in electrodiagnosis or electrotherapy.

When we speak of the electrical excitability of muscle, we immediately encounter difficulties. If electrodes are applied directly to a muscle with intact innervation, the muscle is not stimulated directly but indirectly through its nerve. Hence unless curarization or single fiber preparations are used, or latent period measurements are taken, it is probable that most so-called direct stimulation of muscle actually is indirect stimulation.

The response of an irritable tissue, such as muscle and nerve, to an electrical stimulus depends upon several factors:

1. The form of the current; that is, its rate of rise di/dt.
2. The current intensity
3. The duration of current flow

Each of these factors has been employed to study electrical excitability of muscle. The most widely publicized test involves the study of the intensity-duration relationship and the determination of chronaxie. This concept of a universal time factor in excitation was introduced by Lapicque. Chronaxie is defined as the least effective duration of a stimulus whose intensity is twice the rheobase. The familiar clinical test of Erb is an application of the strength duration relationship. The loss of excitability of a denervated muscle to a tetanizing (faradic) current is an expression of the fact that its chronaxie has been lengthened. Chronaxie has been used clinically as a measure of excitability for the study of denervated muscle. Lapicque's critics have made it necessary to modify markedly Lapicque's original concept of chronaxie. For example it has been found that the chronaxie will vary with such factors as size of electrodes, position of electrodes and distance between electrodes.

Lucas[16] and Rushton[17,18] have shown that at least two distinct strength-duration curves can be obtained from muscle under certain experimental conditions, the so-called alpha and gamma excitability. They have identified the alpha curve with muscle, and the gamma curve with nerve. They also believe they are able to demonstrate a third or beta curve which they associate with the neuromuscular junction. The muscle curve is characterized by a chronaxie ten to one hundred times that of its motor nerve. It is interesting to note, however, that the rheobase value is less for muscle than for nerve. Theoretically, it is predictable, according to Blair[19], that a lengthening of chronaxie will be accompanied by a decreased rheobase unless a change in threshold occurs. Hence, a slowing of excitability in the ordinary sense (i. e. lengthening of chronaxie) is accompanied by a lowered rheobase. This means a decreased irritability to currents of short duration and an increased irritability to currents of long duration. These relationships are apparent in the alpha and gamma curves of muscle. It is apparent in the strength-duration curves of muscles at different temperatures. Lapicque originally denied the existance of the alpha curve but later reversed his opinion. He[20,21] still denies, however, that the alpha curve is a true strength-duration curve, and states that chronaxies measured on it are false chronaxies.

At present no well controlled study of the strength-duration curve throughout the course of atrophy has been presented. The available evidence, however, indicates that the short chronaxie of normal muscle is abruptly replaced, without preliminary modification, by a lengthened chronaxie 10 to 100 times the normal[2]. It is possible, therefore, that the lengthened chronaxie which appears rather suddenly represents the true muscle excitability of Lucas and Rushton. The research of Rosenbleuth and Dempsey[22] supports this concept. Rosenbleuth reports no change occurs in the chronaxie of nerve during the first four days following section; but after the first four days neuromuscular transmission suddenly ceases. Reports do not agree relative to the rheobase changes occurring in denervated muscles. Theoretically one would expect a decrease. A less well known test of muscle excitability is the study of the threshold-time of rise function for linear rising currents of different slopes. Such currents were extensively studied by Lucas[23], Fabre[24] and Blair[25]. Their employment as a diagnostic test in peripheral nerve injuries

has recently been suggested by Bauwens[26,27].

A third method of studying electrical excitability is the determination of the strength-frequency function. This has been studied extensively on normal muscle and nerve by A. V. Hill[28], Achele's[29], Lullies[46], Coppeé[30], Koch[31] and Katz[32]. It would appear that this type of test has a more direct bearing on the choice of current for stimulation than any other. Yet it has not been applied clinically as far as we know. That the three tests are all interrelated and depend upon the three basic factors in electric excitation will become obvious upon closer examination. Thus a change in the frequency of a sine wave stimulus involves:

1. A change in the rate of rise of the individual pulse, and
2. A change in the duration of each pulse.

There is no standard method for the expression and comparison of excitability. Perhaps the most familiar clinical test is that of Erb which measures galvanic and faradic excitability. Others have employed chronaxie measurements. Recently Moor[33] and Watkins[34] have studied the entire strength-duration or voltage-capacity curves. Hill[28,35,36], Monnier[37], Blair[25,38] and Rashevsky[39] have presented some theoretical treatments of electrical excitability which allow the latter to be expressed in fairly quantitative terms bearing some theoretical and perhaps practical significance. These theories all are basically very similar and are founded on simple principles which make no attempt to explain the actual physical or biologic nature of the process but simply allow existing excitability data to be treated quantitatively. For our purpose the treatment of A. V. Hill will be followed. Following his terminology we propose to express electric excitability in terms of a single intensity factor, (i. e., rheobase) and two time factors "K" which is directly related to Lapicque's chronaxie, and lambda which is directly related to Keith Lucas' minimal current gradient and Fabre's "Constante Linear". These three values afford a fairly complete picture of the excitation process.

The object of electrical muscle stimulation obviously should be to produce a muscular contraction which stimulates a normal voluntary contraction as closely as possible. It is well known to physiologists that a normal voluntary contraction is not a simple twitch but rather a smoothly graded tetanus. The mechanism by which such a contraction is produced has been studied extensively and is quite well understood at the present time. An understanding of this mechanism is essential for an understanding of electrical stimulation.

A skeletal muscle is composed of a number of individual motor units. Grading of voluntary muscular contraction is accomplished in two ways:

1. By an increasing number of motor units becoming active.
2. By an increasing frequency of response of individual units producing a more and more completely fused tetanus. The first is normally accomplished by an increase in the number of nerve fibers discharging; it can be accomplished artifically by an electrical stimulus of gradually increasing intensity. The second is normally accomplished by an increased frequency of discharge of individual neurons; it can be accomplished artifically by an increase in the frequency of electrical stimulation.

Hence in designing an electrical current which will produce the most physiologic stimulus for skeletal muscle, two separate and distinct problems present themselves.

1. The optimum wave for the production of a single twitch, and
2. The variation in intensity and frequency of these individual current pulses to produce a smoothly graded tetanus. Let us consider these two phases separately.

The wave form which will produce a contraction with the least intensity of current may be considered the optimum. For normal skeletal muscle this problem has been studied extensively and treated quantitatively by Hill[27] and others. It is known that the greater the rate of increase in current intensity, the more effective the stimulus. Hence the optimum wave form would be one with an instantaneous rise and a duration sufficient for stimulation. As the slope of current rises becomes less steep, more current is required until eventually a slope is reached where stimulation is impossible regardless of how much the current intensity may be increased. This is the minimal current gradient of Keith Lucas[23] and Fabre[24].

Similar detailed studies on denervated muscle appear to be lacking. It is known, however, that the threshold for slowly rising currents is lower in denervated than in normal muscle. This has been used as the basis for the so-called "progressive" currents which supposedly stimulate denervated muscle without affecting normal muscles in the vicinity. However, it is not clear from the literature whether the threshold for slowly rising currents actually becomes lower than that for currents of instantaneous rise.

The normal mechanism by which voluntary muscle contractions are graded in strength have been studied by a number of investigators[40-44]. Briscoe[45] in 1928 appears to have been the first to attempt to apply information of this type to electrical stimulation. In general the smooth voluntary contractions involve a gradual increase in the frequency of individual unit responses. Of the more recent studies on the frequency of discharge, Smith[42] reports a minimum of five to seven per second during slight activity and nineteen to twenty per second during a submaximal contraction. Lindsley[43] recorded frequencies varying from three to fifty per second.

SUMMARY

1. *Theoretical Considerations.* It thus would appear that the ideal stimulating current for normal muscle would consist of a series of pulses of instantaneous rise which gradually increased in intensity from threshold to maximal and in frequency from zero to one hundred per second. For denervated muscle the ideal current should be of similar form but the individual pulses would have to be of longer duration and lower frequency and perhaps of more gradual rise.

2. *Practical considerations.* It is not convenient and probably is not necessary to attain these ideal currents. A very close approximation can be obtained with an apparatus which is capable of delivering sine waves of variable frequency from 0. 1 to 100 cycles per second, and in which provision is made for amplitude modulation (surging). It is unfortunate that the terms "galvanic" and "faradic" have become so deeply ingrained in the clinical and physiological literature. Actually from a physiological viewpoint there is no sharp line of demarcation between them. A normal voluntary contraction is a tetanic contraction. Hence every current should be a tetanizing current. That tetanic contractions can be produced in denervated muscle by proper frequency adjustment has been reported by Fischer[4]. Thus a normal muscle will respond with a smooth tetanic contraction to a one hundred cycle wave surged at twenty to thirty per minute. A recently denervated muscle may give a similar response to a twenty cycle wave. From this viewpoint "galvanic" current simply represents a "faradic" current of very low frequency.

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Correction

In the article entitled "The Importance of Technic in Electrotherapy" by Helen Kaiser which appeared in the September-October 1942 issue of the REVIEW, page 260, second column, fifth line from the bottom should read "the distance is *de*creased one-half."

Arthritis

Nathan R. Abrams, M.D.

Arthritis has been with us ever since the beginning of Man. This has been proven by archeological studies which have shown arthritic changes in the skeletons of the ape-man of the Pliocene Age (1,000,000 years ago) and of prehistoric dinosaurs of half a million years ago.[1] Evidence of "cave gout" (a name applied to arthritis deformans) is common in skeletons of neolithic man (the Stone Age, 25,000 years ago).

In spite of these facts it still remains a scourge of mankind and has rightly deserved the title, "King of Human Misery."[2] It may be defined as the disease which kills the fewest and cripples the most.

A few years ago a survey of chronic diseases, conducted by the U. S. Public Health Service, disclosed that rheumatism (including arthritis, gout, neuritis, etc.) was more prevalent than heart disease, cancer, tuberculosis and diabetes combined.[3] It was estimated that 2.2 per cent of the population of our country had some form of chronic arthritis or rheumatism, more than 1 per cent have disabling rheumatism and 0.85 per cent are bed-ridden. It was found to be responsible for 97,000,000 days lost from work in a single year, this figure being larger than that from any other chronic disability, except for nervous and mental diseases. These figures included all rheumatic diseases, but it was estimated that arthritis alone disabled approximately 1,500,000 persons each year.

In order to understand arthritis it is necessary first to know what a normal joint looks like. Briefly, a joint consists of two bones in close apposition with each other and separated by a small space, the joint space, in which there are a few drops of a clear yellowish liquid, the synovial fluid. The ends of the bones are covered by a layer of cartilage. Enveloping the entire joint is the joint capsule, the inner lining of which is called the synovial membrane. The outer parts of the capsule merge with surrounding muscles and tendons.

In the introduction of this article the word "arthritis" was used as though it covered all cases of joint disease. Actually, this is not so and one of the most important points in understanding joint disease is recognition of the fact that there are many types of arthritis, as follows:

1. Arthritis of known origin
   - A. Traumatic
   - B. Infections—
     - Staphylococcus
     - Streptococcus
     - Gonococcus
     - Meningococcus
     - Tuberculosis
     - Typhoid Fever
     - Undulant Fever
     - Syphilis
   - C. Neuropathic—(Charcot joints)
     - Tabes Dorsalis
     - Syringomyelia
     - Leprosy
   - D. Metabolic—
     - Gout
   - E. Allergic—
     - Serum sickness
2. Arthritis of unknown origin
   - A. Osteoarthritis—(Hypertrophic; degenerative joint disease)
   - B. Rheumatoid—(Atrophic; chronic nonspecific infectious, etc.)
   - C. Rheumatic fever
   - D. Other diseases—Neoplasms, etc.

This article, however, will discuss only three of these types of joint disease, the first of which is gouty arthritis.

During the 19th century gout was diagnosed frequently; during this century it is seldom diagnosed. This has led many people to believe it is "dying out," but I doubt whether this is true. During the 19th century little was known about arthritis and many cases undoubtedly were mislabeled "gout." On the other hand, most cases of

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this disease are missed at the present time and the average case of gout goes on for about twelve years before the proper diagnosis is suspected.[4] There probably are several reasons for this. Formerly it was believed that gout was a reprehensible disease, that it was associated with rich living and heavy drinking. Centuries ago, the old Greek poets like Virgil, Martial and Juvenal, poked fun at the unfortunate victims of this disease and blamed it on their mode of living. This idea has now been discarded to a certain extent and we recognize gouty arthritis in some of our poorest clinic patients, and in large arthritis clinics gout is the cause of about 5 per cent of all cases of arthritis which are observed.

Another reason for missing the diagnosis of gout is that the older textbooks stressed the facts that attacks occurred in the big toe, the blood uric acid was elevated and tophi (chalky deposits of sodium urate) were characteristic. Another point stressed was that the X-ray revealed "punched-out" areas in the joints. Actually, all of these do occur in gout, but if one waits for them to appear, the diagnosis certainly will not be made before the twelve year average now existing.

Gout is thought to be a metabolic disease, a disturbance of purine metabolism in the body. It occurs approximately ten times as often in the male as in the female. In many cases it is hereditary, being transmitted from father to son. It has its onset at the average age of forty.[5] However, it occurs occasionally in children and when it does, it usually is a serious disease. This is true because gout is not limited to the joints. Deposits of sodium urate are found also in the heart, blood vessels, kidneys and other organs, and when it appears early in life, that life is shortened considerably by its ravages.

The most characteristic symptom is that it occurs in acute recurrent attacks, with complete freedom from pain and deformity between early attacks. The first episodes usually are several years apart and last only a few days. With succeeding "bouts," the interval between them is shortened and the attacks themselves last longer. They occur mainly in the spring and fall. While the big toe is involved more often than any other single joint, it is affected in only about 50 per cent of cases in the initial attack.[5] Any joint may be the seat of gouty inflammation, but the jaws, spine, shoulders and hips usually are spared. Most attacks are limited to one or two joints but polyarticular cases often are seen and may be migratory, so that they simulate rheumatic fever. Joints may become red, swollen and extremely painful, the pain being described as the most severe of any type of arthritis. The blood uric acid is elevated as a rule, but this increase is noted in only about 60 per cent of early cases.[4,5] It may be higher during a period of freedom than during a flare-up. Tophi, when present, are pathognomonic of the disease but they rarely occur before five or ten years after its onset and in some cases they never appear. The same may be said of "punched-out" areas on X-ray.

From this description it is seen that acute recurrent attacks without residual pain, deformity or heart disease (to differentiate it from rheumatic fever) may be the only clue to the diagnosis. Certainly it is the most constant one in early cases. Later, chronic gouty arthritis may be present. Another clue is the therapeutic test.[5] Colchicine, in adequate dosage, terminates the attacks within 24 to 72 hours if given early. Cinchophen may be used also but is not so specific and may be dangerous. Complete bed-rest and hot compresses are helpful.

Gouty arthritis probably is the only form of joint disease (aside from true allergic arthritis, if such exists) for which there is a specific diet, and even this diet has been questioned recently.[6] For many years a low-purine diet has been prescribed for this disease and it probably does relieve the body of some strain. Certainly we know that gouty arthritis can be produced experimentally in birds simply by feeding a diet very high in purines.[7]

Most cases of joint disease, (about 75 per cent) fall into two types—osteoarthritis and rheumatoid arthritis.

Osteoarthritis, also known as hypertrophic arthritis, degenerative joint disease, or the old age type of arthritis, is not really an arthritis. The suffix "-itis" means inflammation and since there is no inflammatory reaction in this type of joint disease, the word arthritis is improperly applied to it. This form of joint disease is universally present (anatomically) in everyone over the age of 40, although only about 5 per cent actually have pain with it.

Pathologically it begins with a gradual splitting of the gristle, or cartilage.[8] This process begins before the 20th year of life and progresses with age.[9] As time goes on, this splitting of the cartilage becomes marked, until it extends through the entire layer. At the same time, the rubbing together of the two surfaces of cartilage causes it to wear down. Whenever an organ or tissue in the body is damaged it makes an attempt, at least, to repair itself. Cartilage, however, has a very poor blood supply, and therefore its at-

tempts to repair are only feeble. The underlying bone, however, tries to compensate, so bony spurs are produced. These are most numerous at the edges of the joint.

Pain is produced (among other reasons) when these bony spurs irritate the nerve fibers in the surrounding joint capsule. This same picture can be produced experimentally; thus, if the patella of a normal dog is transplanted to the side of his leg, so that with each step he takes it will strike the bone instead of the groove nature has provided for it, these same changes will take place within a few months time.[10]

From this illustration and from what has been stated above, it is obvious that osteoarthritis is not a true type of arthritis but a condition, rather, occurring as a result of the wear and tear of life and aggravated or initiated by any condition causing chronic irritation to the joint. This is borne out in actual practice, for it causes pain only after exercise and affects, primarily, the weight-bearing joints—the knees, low-back, shoulders and neck. Conditions which aggravate or initiate it include all conditions placing undue stress or strain upon the joints. Thus, obesity, flat-feet, bow-legs, knock-knees and poor posture from any source are the most common causes. Joints which have been the seat of an injury which has injured the cartilage or surrounding ligaments are prone to it.

It is possible that the inheritance of poor gristle (cartilage) is a factor in the onset of this disease. This is particularly true of the condition in the fingers, where we often see it run in families, and in cases beginning relatively early in life—that is, before the age of 40.

From these remarks, treatment of this type of joint disease becomes obvious. All factors causing chronic irritation to the joints must be corrected—weight reduction in the obese, arch-supports for pronated feet, exercises, corsets and splints to correct poor posture and poor body mechanics. Obviously vaccines and the removal of teeth, tonsils, et cetera, have no part in the treatment of this type of joint disease. Heat in any form is beneficial and a hot moist pack, given once or twice a day at home, is as good as any other form and is far better than more elaborate treatment given once a week, as is often done.

The primary purpose of treatment, however, is rest. This is accomplished in part by the correction of poor body mechanics, as stated above, but it also is important that these patients get periods of complete rest, particularly those older patients whose joints show large bony spurs. Just as we instruct patients with heart disease to live within their hearts, so we also must instruct patients with arthritis to live within their joints. If a patient with osteoarthritis is good to his joints, his joints will be good to him.

Regardless of the treatment, however, or of abuse to the joints, this type of joint disease does not cause crippling unless the hip joint is involved (malum coxae senilis). Such reassurance goes a long way in allaying the ever-present fear of practically all arthritic patients.

Rheumatoid arthritis, also known as atrophic, or chronic nonspecific infectious arthritis, is the dreaded form of joint disease for it is the form which causes the most crippling.

In contrast to osteoarthritis, which affects older people as a rule, rheumatoid arthritis may have its onset at any age, from infancy to old age, although most cases begin between the ages of 20 and 50. In children it is known as Still's Disease. It strikes females more often than males, except for the Strumpell-Marie form (spinal type) which is about nine times more common in the male. It may begin acutely or insidiously. The tall, thin, flat-chested, nervous individual, with cold hands and feet seems to be affected more often than the short stocky one.

The exact cause of this disease is not known but most authorities believe it is due to an infection of some kind. In many cases it begins shortly after some mental or physical strain, or after undue exposure to cold and damp. Thus, during the last war many cases in soldiers began shortly after they had been forced to sleep in damp quarters or stand for long hours in slush and mud.

Pathologically this disease begins in the lining of the joint, which becomes thickened and proliferates. This thickened tissue, which we call pannus (and is really the same as proud flesh), then grows into the joint, covering the joint surface. Shortly afterward the pannus invades, then destroys the cartilage. Simultaneously the fibrous tissue of the underlying bone marrow also is activated and invades the cartilage from below, finally meeting and joining the pannus from the joint surface. If the disease progresses, the entire joint surface may be replaced by fibrous tissue and the joint may become completely stiffened (fibrous ankylosis).

While all this is taking place the injured cartilage cells make a rather feeble effort to regenerate, so that some of the fibrous tissue is replaced by what we call fibro-cartilage. The bone cells also are stimulated, however, and they begin to lay down new bone so that if the disease goes on to its farthest possible end the fibrous tissue may be

replaced by bone and there may be one solid sheet of bone, extending from one side of the joint to the other. This is called bony ankylosis. Fortunately not all cases proceed to bony ankylosis; indeed, the disease may stop anywhere along the line.

The appearance of the joint in this disease is altogether different from its appearance in osteoarthritis. As may be expected the symptoms and treatment are different. The disease itself appears to be an infection of the whole body rather than of the joints themselves. Thus patients often complain of a poor appetite and they soon lose weight. They complain of feeling tired on the least exertion and note a loss of strength very early in the disease. Their hands and feet usually feel cold, very often becoming bluish and numb. Frequently they have a low grade fever, a rapid pulse rate and low blood pressure. The joints show all the signs of an inflammation, but they often are more swollen when the patient arises in the morning than later in the day. One of the most characteristic symptoms is the tendency for the joints to feel stiff in the morning.

On examination the joints often assume a spindle shape, with swelling of the joint and atrophy of the muscle on either side. This atrophy is more than the atrophy of disuse. It is a part of the disease. Usually the joints are affected in a symmetrical manner. Thus if one forefinger is affected, the other forefinger usually will be affected; one knee, the other, et cetera. The deformities also are symmetrical.

The treatment of rheumatoid arthritis presents many problems. Until the American Medical Association began a campaign to prevent fraudulent claims for drugs, the newspapers carried dozens of advertisements for worthless "cures" each day. Even today many drugstores sell copper bracelets as aids in removing the poisons of arthritis, although people probably wear them more often as good luck charms against rheumatism.

Not all worthless "cures" emanate from "quacks" or business opportunists. Many originate through honest beliefs of clinicians and are advertised by reliable drug concerns following enthusiastic reports in nationally recognized medical journals. Abstracts of such articles often appear in the daily newspapers or widely read magazines, and patients besiege their physicians for some of the "magic cure". In the case of most of these drugs, the initial reports are not well controlled and after a relatively short time the results of much better controlled studies are published by other investigators, disproving the merit of such treatment. Unfortunately the newspapers and magazines rarely publish these reports.

Why, one may ask, does this state of affairs exist? The answer is obvious. Everyone is seeking a dramatic cure and, because of the crippling, its victims are ready to try anything. Unfortunately there is no specific cure for rheumatoid arthritis. The treatment is long and tedious and the results depend largely upon close cooperation between the patient and everyone of us who has a part in treating him. The results are not dramatic but can be highly satisfactory. Many cases can be cured completely; practically all can be helped. Two things must be remembered: first, there is no short-cut in the treatment; and second, it is much simpler to prevent deformities than to correct them.

As mentioned above, rheumatoid arthritis is an infection of the whole body with symptoms predominating in the joints. Treatment must be directed toward the whole body, therefore, as well as the joints themselves. Since the cause of the disease is unknown, general therapy should be such as to increase the fighting powers of the body, to increase its resistance. Such treatment includes vitamins to correct the deficiencies caused by the infection itself, and a good well-rounded diet high in minerals, vitamins and usually in calories. There is no specific diet for rheumatoid arthritis. Secondary anemias should be treated actively. Blood transfusions often are of value, even when there is no anemia. Diseased teeth, tonsils, et cetera, have lost favor as the cause of this disease. If they are present, however, they create an extra load for the body to carry; therefore, they should be removed, whether or not the individual has arthritis.

Of greatest importance, however, is complete bed-rest. Patients with active rheumatoid arthritis should be treated very much like patients with tuberculosis. Just as rest is the basis of treatment of all other infections so should it be also for the treatment of rheumatoid arthritis. Unfortunately practically every general hospital in the country refuses to admit patients with chronic rheumatoid arthritis unless they require operative correction of their diseased joints. The number of sanitariums available for such patients also is negligible. This state of affairs is false economy, let alone unfair to these patients, for long continued rest in bed in the early stages, with a program to prevent deformities is far more effective and economical to the families and communities of these victims than is the care and burden of already crippled patients.

Patients suffering from this disease often are

given advice by well-meaning friends to "keep moving". No worse advice could be given. However if patients are allowed to remain at complete bed-rest, with no local treatment, their joints certainly will stiffen. Therefore, a program of physical therapy should be instituted from the beginning. In the early stages or in the acute stage, this should consist of heat alone, heat in some form being applied two or three times a day. After a few days, when the acute stage has subsided, exercises and light massage should be begun. Active exercises are better than passive as a rule, but if the acute stage lasts longer than one week, passive ones should be started first, moving each joint through as much of its full range of motion as can be tolerated comfortably. No form of exercise should be continued if it causes lasting pain afterward. Often, in the early stages, these measures are sufficient to prevent deformities. When deformities do occur they usually do so in flexion. At the first sign of a deformity steps should be taken to overcome it and to prevent its progression. In the case of the wrist, knees and feet this is accomplished best by applying a plaster cast for a few days, then splitting it in half so that it can be removed for physical therapy during the day and kept in place at night.

In addition to the measures outlined, patients also should receive regular doses of salicylates. If their pain can be diminished they will be much more likely to tolerate their exercises. When crippling deformities, particularly with ankylosis, already have occurred, operative treatment in the form of arthroplastics, arthrodesis, and such, may enable patients to regain some of the functions of their joints. Such treatment, however, is far less certain and more expensive than the prevention of these deformities. Operations should not be performed during active phases of the disease as healing is not good at this time and flare-ups in new joints may occur.

Recently a new form of therapy, a short-cut, has been advocated. This treatment is in the form of injections of gold. The treatment is accompanied by dangerous reactions in a large percentage of cases, however, and is not universally successful. Therefore it should not be given by anyone who is not thoroughly familiar with its reactions as well as with arthritis, for it is of no value in any type of arthritis other than rheumatoid. In rheumatoid arthritis it seems to be very promising.

Other forms of specific therapy which are used frequently include massive doses of vitamins D and B_1, and fever therapy. The use of massive doses of vitamin D is expensive and probably not without danger[11]. It is of benefit in some cases, but probably more as a genera tonic than as a specific form of treatmen Whether massive doses are more beneficial tha small doses, as in cod-liver oil, remains to b proven. Vitamin B_1—thiamin chloride—has n specific action here. It is helpful in relievin definite deficiencies of this vitamin in this disea as well as in others. Since patients with avita minosis B_1 usually suffer from deficiencies of th other factors of the B complex, it is probabl wiser to give the whole complex.

Fever therapy is of temporary value only. Th beneficial effects rarely last longer than two o three months.

Bee venom, sulfur injections, iodides and ca cium are of little value. Snake venom helps onl because of its analgesic qualities. It is no specific for the arthritis diseases and its effec lasts only while it is being given.

Regardless of what specific measures ever ar used, the general plan of treatment must in clude the measures outlined above. When joint have suffered irreversible damage, that is, de struction of the cartilage or ankylosis, no form of treatment can restore that joint to normal Often, however, compromises can be made an patients who cannot be cured completely nevertheless can be benefitted sufficiently for them t cease being a burden on others. It is the hop of all of us who are interested in joint disea that some day sanitaria similar to those used fo tuberculosis will be established for the treat ment of arthritis. Such institutions would d much toward rehabilitating the victim of thi disease as well as preventing the unpleasant live so many patients are doomed to endure.

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Psychological Factors in Testing and Training the Cerebral Palsied

Lillian G. Portenier

Most handicapped children present some problem or problems in testing and training, the exact nature and seriousness of the problems depending largely upon the nature and seriousness of the disabilities. As stated by Phelps,[1] "all forms of cerebral palsy are the result of anomaly, injury, or disease of the brain, a part of the body which functions are so diverse and so difficult to evaluate as to allow for infinite variations of the condition." Consequently, the problems presented in testing and training the cerebral palsied are many and varied.

The present study is based on work with forty children ranging in age from 2 years, 7 months (2-7) to 19 years, 10 months (19-10) at the time they were first contacted. The median age of the group was 8-6 and the interquartile range 7-6 to 13-6. Most of the subjects were tested at the treatment center for crippled children in the Memorial Hospital at Casper, Wyoming. For convenience a few of the patients were brought to the laboratory in the psychology department at the University of Wyoming on their way to or from Casper. All cases were referred to the writer by Margaret H. Jones, M. D., Director, Division of Maternal and Child Health and Crippled Children, State Department of Public Health, Cheyenne.

In 1936 the Wyoming State Department of Public Health initiated a program of work for crippled children. It was found that cerebral palsy ranked second only to poliomyelitis as the greatest cause of crippling in the state. Out of 809 crippled children on the lists at the close of 1940, 92 or 11.4 per cent were classed as cerebral palsy patients. In an effort to work out a plan feasible for a widely scattered rural population, the situation to be met in Wyoming, a treatment center was developed in connection with the Memorial Hospital in Casper. In order that educational facilities might be arranged in keeping with the abilities of each child, Doctor Jones, who initiated the project, attempted to secure an intelligence test rating on every patient and planned to have the tests repeated at approximately yearly intervals. Due to the great distances in Wyoming, a dearth of qualified testers for such cases, financial considerations, et cetera, this goal has not been realized fully.

An approximate intelligence quotient rating based largely on the results of standardized tests has been determined for each of the forty subjects used for this study. Every child was given from one to four tests. The Revised Stanford-Binet, Form L, proved most satisfactory for the large majority of the cases. However, the Revised Stanford, Form M; the Wechsler-Bellevue Scale for measuring adult intelligence, particularly Part One, the verbal scale; the Minnesota Preschool Scale; and the Grace Arthur Scale of Performance Tests proved very helpful in testing patients with certain types of handicaps. To date, of the forty children given intelligence ratings, 55 per cent (22 cases) have been tested only once, 25 per cent (10 cases) twice, 15 per cent (6 cases) three times, and only 5 per cent (2 cases) have been tested four times. In retesting a subject the first time, a different scale or a different form of the original scale usually was tried. In the second and third retests the scale that had been found most satisfactory for a given subject in the previous tests was used again. As has been stated the Revised Stanford-Binet, Form L, was found most reliable for this group of subjects.

In giving the examination great care was exercised in the choice of the scale and also in tests used in any given scale. The exact nature, extent and degree of the patient's physical handicap was a major consideration. Before testing any patient the examiner, in cooperation with Doctor Jones, attempted to ascertain the type and extent of motor involvement and the presence of associated handicaps—particularly visual,

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auditory and speech handicaps. In a few cases the physical handicaps were such as to interfere very little, or not at all, with the standardized procedure. In some cases, however, the motor, visual, auditory and/or speech handicaps were so severe and general that tests could be administered only with the greatest precautions. In general, tests of the verbal type were found most usable since practically all of the patients are handicapped to some degree by spasticity, athetosis, tremors, rigidity, incoordination, et cetera. Some of the children were further handicapped by visual, auditory and/or speech defects. For the two latter types of defects performance tests often proved most satisfactory, particularly for cases whose motor involvements were not serious.

In using age scales of the Stanford-Binet type it frequently was impossible to use all tests at an age level. In determining the intelligence quotient of a given subject no results were considered unless the standardized procedure had been followed quite closely in administering the test. If a subject found it impossible to respond to a test because of his physical handicaps the credit allowed was determined by the number of tests which the subject could take at the age level. Thus, if only three of the six tests in a given year could be taken, any of the three correct was allowed four months' credit. In very few cases was it impossible to give more than half of the tests at any age level.

Some of these patients had been tested by other examiners. This made it possible to check the reliability of results in three ways: First, by retesting a subject with the same test after an interval of four to twelve months; second, by retesting a subject with another form of the same scale or with a different scale; and third, by comparing the results with those of other examiners. With but few exceptions the results of the retests and those of other examiners agreed quite closely with the results secured by the first tests. For all children suffering serious disabilities the results secured by the formal test situation were checked and supplemented by information from as many other available sources as possible. Conversation with parents often indicated abilities that were not elicited by the standardized test procedure. Information in the child's history regarding his early development, such as age of walking and talking, his general social and personality reactions, his interests, occupations, the teacher's report of educational progress, and the reports of the physical therapist and the physician on the child's ability to carry out instructions often proved helpful in determining or checking the mental status.

The range of intelligence quotients and the percentage of cases falling at the various mental levels agree fairly well with a similar study by McIntire[2] including 146 cases referred to clinics in New Jersey. In the few cases where rather marked differences were found between two or more successive tests on a given subject, the first tests usually had been given under very unfavorable circumstances. In some cases satisfactory rapport could not be established due to the strangeness of the situation, including the examiner, or the subject was overly fatigued by a long trip, or was suffering from a cold, a headache, or some other condition prevailed that could not be controlled at the time the test was scheduled.

For some children an increase in I. Q. on the retest appeared to result from training and experience during the interval between examinations. Following the tests the parents were given suggestions for training the child. Speech training, increase in vocabulary through conversation and special drill, broadening the child's background by telling and reading stories, by games, pictures, trips and various other devices, and particularly improving the attention span, and developing persistence and emotional maturity, along with the improvement in motor control of the hands, arms and body generally all tended to increase the intelligence quotient since the child was able to give more adequate evidence of his ability.

For practical purposes the aim of the testing program is to analyze the child's capacity to achieve along various lines. To what extent can he be expected to profit from school or home training and what kind of an educational program should be planned for him? It is not essential to establish a mental status in terms of mental age. A mental age based exclusively on a formal test procedure has little significance for many of these children. All intelligence scales assume common experiences on the part of the subjects tested. Environments and experiences differ widely for normal children from varying economic and cultural backgrounds, often to the extent of invalidating the tests. Many spastics are unable to attend school; consequently their social environment may be very greatly restricted. Motor and sensory defects may limit their experiences so that any scales used are not a valid measure of their capacities. Thus it seems only fair to supplement the test results by infor-

mation from all other available sources and to revise the estimates of mental status and predictions of educability after a period of training has enabled them to develop motor control, speech, vocabulary and general background somewhat comparable to that of normal children. Phelps[3] states, "Of course, a great many of them (children with spastic paralysis) are retarded since in the first place, because of their handicap they do not have the advantages that other children have, and in the second place (which is more important), they have had the handicap since birth. This puts them in a different category from the infantile paralysis group in whom the primary action patterns were formed before the paralysis set in and recovery does not involve teaching primary action patterns."

Most of the recent tests place little emphasis on speed, especially for many verbal type tests. As stated by Maurer[4], "Such time limits as are still included have as their purpose signaling the examiner that, under normal circumstances, the child's probability of being able to succeed with that particular task after a given length of time is very small indeed and she may safely proceed to the next test. With a few exceptions, time limits may be ignored completely without invalidating the tests." A competent examiner may make slight modifications in procedure without interfering with the value of the test. Such factors are of marked advantage to handicapped children. In tests such as word naming and dissected sentences, if the child works continuously even though very slowly a few seconds overtime is not serious. Reproducing from memory a design of beads may be accomplished by some subjects with motor disability if the time limits set are not adhered to, too strictly. It was necessary, however, to omit the bead stringing test more frequently than any others in working with these subjects because of the fairly precise motor coordinations involved.

Aside from the physical defects one of the major problems encountered in the testing as well as in the training program was emotional immaturity. Parents of a normal child often assume an over-solicitous attitude thus retarding emotional development, but emotional complexities become far more involved and serious in the parent-child relationship when the child suffers serious disabilities. Not infrequently overprotection prevents the full development of their already limited abilities. Some parents find happiness and satisfaction in caring for handicapped children while for others the physical and emotional strain involved is such as to disrupt both the physical and the mental health of one or both parents. Thus the child already seriously handicapped is reared in an unwholesome atmosphere of tension which further complicates his problems. Even more than normal children the handicapped child may be badly spoiled and may not have developed habits of persistence further complicating the otherwise extremely difficult test situation.

Fatigue is another factor commonly encountered in testing and training such cases. Most persons with cerebral palsy tire very rapidly. It is necessary to allow more time than usually is allotted for a test in order that the test period may be broken up into fairly short units with frequent periods for relaxation. Often it is necessary to extend the test period over two or more days.

Due to the multiplicity of problems involved in predicting mental status, educational training should be attempted with every subject who is capable of making any responses indicative of intelligence before being given up as hopeless. A well-rounded educational program should be provided including association with other children, recreation and vocational guidance, as well as academic work with the aim of assisting them in living as normal lives as possible considering their disabilities. The Bill of Rights for the Handicapped Child[5] which was adopted by the White House Conference in 1930 stressed the importance of training him "for the fullest life of which he is capable." It may not be possible for many of them to become wholly or even partially self-supporting, but as emphasized in the Bill of Rights, we can assist them "to a life on which his handicap casts no shadow but which is full day by day with those things which make it worthwhile, with comradeship, love, work, play, laughter and tears,—a life in which these things bring continually increasing growth, richness, release of energies, joy in achievement."

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Coordination of Services to Crippled Children

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Introduction

Private agencies have been the pioneers in constructive services to the disabled, in recognizing their abilities and minimizing their deficiencies. They have waged and still are waging intensive campaigns to overcome the social antipathy to physical abnormality. While giving services themselves, they have sought and gained public support for many useful laws, state and federal, which now operate in behalf of the handicapped. That they will continue to progress in these endeavors in their own respective fields is undoubted. But many in this field are coming to realize that this record of accomplishments can be materially hastened and advanced by a practical program of organized cooperation among these splendid private organizations.

Agencies interested in the crippled and the physically disabled for many years have sought ways and means to assist these types of the physically handicapped medically, educationally and socially. Such agencies find they have many things in common: they all are interested in (a) ways to find such disabled persons early after the onset of their disabilities, (b) securing for them expert medical diagnosis and treatment, (c) providing special educational equipment and training, (d) vocational guidance and rehabilitation, and (e) suitable employment.

Major Problems to Face

Those working in behalf of all types of the physically handicapped must strive to overcome public ignorance and apathy which hinders their progress. Well-meaning but misinformed persons often try to secure legislation which must be opposed because it would be detrimental to the best interests of the disabled. People are too much inclined to ameliorate the immediate handicap and neglect the larger problem of preventing the causes which produce disability.

The principal legislation which seriously affects the employment of physically handicapped persons is that found in many state Workmen's Compensation acts. Under these laws an employer must pay compensation to an injured worker for his total disability, even though part of this disability is due to a previous handicap. If a one-eyed or one-legged man loses his other eye, or his other leg, in an industrial accident, the employer (or his insurance company) pays for the total disability, where he would have to pay for loss of only one organ or limb if the worker had been a normal individual. In these states, therefore, the employer really takes an added risk in hiring the handicapped. There is a great need for cooperative action to remedy this situation. The state must be led, through properly drawn amendments to these acts, to assume the excess risk in employing the disabled.

It is highly essential to get better and more willing cooperation from industrial employers and from civil service commissioners and employers. Private agencies may well coordinate their efforts in solving this whole employment problem. They face another large problem in successfully presenting to other professional workers the standards of services which they sponsor out of a long experience. They must combat also the tendency of many people to seek pensions and aid from cultists or groups of advertising healers. Trained private groups also face a problem in getting many of their clients to admit they are handicapped and to seek scientific advice and help.

In solving practically every problem common to two or more types of handicapped people, greater progress is possible if all the agencies in the field cooperate and coordinate their respective programs in one united attack on the common problem.

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Read before the Joint Associate Group Meeting, American Society for the Hard of Hearing, National Society for Crippled Children, at National Conference of Social Work, New Orleans, La., May 11, 1942.

PROGRAMS OF COORDINATION

It may be well in introducing the subject of coordination to say something about the nature of coordination. This can be done best by summarizing a statement on "Unity" made over the radio by Mr. W. J. Cameron of the Ford Motor Company. "There is not much use to talk about unity, for it does not come by talk; but if we must talk about it let us see clearly what it is and where it begins. To the despot, unity means uniformity, and yet, so far from being uniformity, unity may be a thing of most wide and beautiful diversity. To the promoter of any collective effort unity means an armistice of all differences of opinion until the work in hand is accomplished, and yet, rather than suppressing differences, unity may make them contributory to a common end. . . . Certainly we cannot construct it into being nor organize it into life; it did not come that way in the first place,—it just grew. . . ."

Cooperation among the agencies working among the crippled and physically handicapped has been growing slowly in recent years. We believe it can be accelerated both by talking about it and organizing to hasten its growth.

The National Society for Crippled Children consciously endeavors to foster coordination of effort and cooperation by recommending to state and local societies for crippled children (a) the formation of advisory committees composed of persons chosen from various civic, service and fraternal organizations as well as public officials interested in the cripple, (b) the exchange of publications and speakers from other states, (c) the holding of conferences with other groups working for the disabled, and (d) presenting programs concerning the crippled at conventions of professional, educational, recreational, health, rehabilitation and employment groups. Moreover, many affiliated state and local crippled children societies are cooperating with other agencies in organizing and coordinating all the services, public and private, in the state or community.

SPECIFIC INSTANCES OF COORDINATED EFFORT

In Cleveland, Ohio, the private and public agencies interested in the cripple work together in an organized way. A case committee composed of representatives from every agency serving handicapped people holds weekly meetings at which each individual case is introduced, and agencies assigned their particular activities to the individual, thus assuring as complete a service as possible without duplication of efforts.

From the time a crippled child is found, this coordinated program serves him. When he finishes the elementary grades in special or regular schools each step of his future is worked out for and with him. His interests and aptitudes have been noted through a cooperative study by his educational instructors and the supervisor of vocational rehabilitation. He has constant vocational guidance.

No gap is allowed in his course when he is promoted to new services. The Cuyahoga County Society for Crippled Children, hospitals and convalescent homes, the County Child Welfare Board, the public schools, the Community Fund, the Association for the Crippled and Disabled, the health department, the Cleveland Visiting Nurse Association and the State Services for Crippled Children all work together. A special placement bureau operates with all these agencies and the Public Employment Services. A summer camp for crippled children is conducted each year by the County Society for Crippled Children. Kiwanis, Rotary and other service clubs fit their work into this coordinated program. The school system maintains schools in the hospitals and convalescent homes and furnishes teachers in the family homes where necessary. The offices of the Vocational Rehabilitation Supervisor and the placement agency are maintained in connection with the workshops of the Association for the Crippled and Disabled. A special workshop has been opened to employ the epileptics, hitherto unprovided for in the community.

This program represents unity in diversity. Decentralized services are made to work together. The program does not "suppress differences" but sees that they are "contributory to a common end."

The rehabilitation workshop of Hartford, Connecticut, is now operated as a joint community project by the Hartford Tuberculosis and Public Health Society and the Connecticut Society for Crippled Children. Here it is recognized that a plan of care which neglects a patient after medical treatment not only fails him at a critical time but wastes the money which has been spent on him. It is realized that vocational rehabilitation is of major importance. Cases admitted to the workshop for work treatment through the State Bureau of Vocational Rehabilitation are accepted at a cost which is set after a conference between the staff of the workshop and the State Supervisor of Rehabilitation. Funds raised by the Christmas and Easter Seal Sales here are working together in a complete and integrated service. Here is a fine example of cooperation among one

public and two private state-wide agencies and a number of local agencies.

In Bridgeport, Connecticut, another local chapter of the Connecticut Society for Crippled Children cooperates with the Junior League in sponsoring a workshop for crippled children and adults. Thirty volunteers from the Junior League assist the regular paid staff of the workshop. Local physicians and the Crippled Children's Clinic refer cases needing treatment in the curative department. The Connecticut Employment Service administers tests for finger dexterity, mental ability and vocational aptitude for clients in the vocational department. Cases are referred from the workshop to the State Vocational Rehabilitation Service for additional help. A similar cooperative effort is now developing in New Haven. Employers are actively cooperating in all three units because of the great demand for war man-power.

In 1934 several agencies in Evanston, Illinois, realized that crippled children of that city were not receiving attention—their education, especially, was inadequate. Every agency was asked to list all school-age crippled children known to them. These cases were studied and upon the recommendation of physicians a number were enrolled in a special class. The staff consisted of a teacher and a graduate nurse employed by the Board of Education and a physical therapist employed by the Junior League. The Visiting Nurse Association paid this physical therapist for attending other patients who were not able to go to either the school or the physical therapy department of the local hospital. The next year, the Evanston Society for Crippled Children was initiated. Every service club in the community had a part in its organization. It soon established a brace loan-fund, furnished hospital care and supplied equipment for homebound patients and some for the school which the Board of Education was unable to finance. Later another room was secured at the school to be used for rest periods and occupational therapy. Later still a bathroom was added, and a hubbard tank, a tank table, ultraviolet ray lamp, victrola, radio and certain apparatus for spastic pupils. This unit "just grew" because the people of Evanston were ready for this new type of service, but it grew more rapidly after the community organized to coordinate its interests and services. Evanston's next step will be the establishment of a curative workshop.

The New Hampshire Society for Crippled Children in 1939 appealed to the Manchester Rotary Club for assistance in bringing education to the crippled children of the city. The club responded with money for a home teacher. The Rehabilitation Service located a properly trained and interested teacher. It was known from the start that one teacher could not care for all such children. The Crippled Children Service of the State Board of Health furnished the names of the crippled children. The city school authorities gave all the assistance possible locally and called this problem to the attention of the educators of the state. The hospitals helped to point out the need of teachers for their patients. The district nursing association and the public health nurses lent every aid they could to the project.

All these groups not only worked together on the local program but were able to persuade the legislature of New Hampshire to create a state-wide program of special education for physically handicapped children. To do this they studied such laws already enacted in other states and gave the benefit of their findings to the legislators and the Governor.

It is well to note here that the New Hampshire Society for Crippled Children in 1940 invited the New Hampshire Foundation for the Deaf and the Concord Society for the Hard of Hearing to become divisions of the Society. At present the agencies for the blind also are cooperating.

This fine cooperative work did not stop with the passage of the educational Act of 1939 or with the merger with the Foundation for the Deaf. The home teacher idea was expanded into a general program for the homebound of all ages. Over a year ago this program was reaching one hundred homebound persons with that many more on a waiting list. Other cooperating agencies at the present time are the Shut-In Society, the Forty and Eight, and the 4-H Clubs of the state. An occupational therapist gives state supervision to the vocational work of the handicapped.

In 1934 the Milwaukee County Association for the Disabled appointed a Committee on Coordination composed of the executives of eleven agencies then serving the physically handicapped. This Committee established and supervises a registration bureau and carries on an intensive indirect service to (a) prevent handicapped persons from being lost sight of, (b) get all available services for each such person at the proper time, (c) secure employment for them and additional training between employment periods and (d) assist handicapped persons socially.

The cooperative program included the State Vocational Rehabilitation Bureau, the National Youth Administration and the Goodwill Indus-

tries. The latter agency loaned for part-time service one of its executives to direct the work of the Bureau and Committee until a full-time director could be employed. Special blanks for reporting cases were furnished to each participating agency. Reports were called for on all cases at least once each month.

In 1940 there were eighteen organizations cooperating in furnishing Holler Park Day Camp for 320 handicapped children. All the funds raised for this purpose went for the maintenance of the camp as the salaries were all paid by the National Youth Administration. In addition to recreation, handicraft was carried on under the direction of cooperating students from the University.

The Rehabilitation Division and the Milwaukee Vocational School cooperate by giving service and training to the "Homecrafters"—a group of physically disabled people between the ages of 16 and 60 who desire to become producing members of the community. They receive educational and vocational guidance, instructional supplies and training. The Service Club and other cooperating agencies find new and saleable articles for the homebound to manufacture and a market for these finished products.

Out of this cooperative project in Milwaukee County grew an effort to extend many of its services throughout the State of Wisconsin. In 1936 a survey was started designed to find out how many disabled people there were in the state who were not eligible or feasible for vocational rehabilitation. A year later experimental service programs were started for these homebound handicapped people in local communities having county chapters of the Wisconsin Association for the Disabled, and efforts were made to get state and federal aid for these homebound programs. The Recreation Division of the Works Progress Administration, the N.Y.A., the Wisconsin Association for the Disabled, and the State Board of Vocational Rehabilitation cooperated in publishing a craft handbook for this service.

Although the efforts to secure state and federal governmental support for this homebound program failed in 1937, the groups kept up their united effort and in 1941 succeeded in securing state legislation, an accompanying state appropriation and a federal administrative ruling permitting special federal-state rehabilitation funds to be used for the homebound. The appropriation for the fiscal year 1941-1942 is $25,000. This employs 28 teachers who give educational and vocational instruction to homebound persons over sixteen. The state houses the supervisor's office, central storerooms, exhibit rooms and a sales room.

In Baltimore, Maryland, handicapped people served by eighteen agencies received a boost when the Volunteer Bureau of the Council of Jewish Women opened a craftmart in the fall of 1932. The Bureau paid the cost of operating the shop, and the local hospitals, convalescent homes, workshops, clinics, sanatoria and even the house of correction pooled their best-made articles of handicraft and needlework to be sold at the shop. Because the shop maintained high standards of workmanship and carried such a variety of merchandise, it caused a very material increase in the sale of goods manufactured by the handicapped.

SOME PUBLIC EFFORTS OF COORDINATION

There is provided in the Oregon, Florida and California educational acts of 1941 a program of cooperation. In the Oregon law the provisions state that the State Superintendent of Public Instruction shall cooperate with the "state child guidance clinic, the state board of health, the Oregon state school for the blind, . . . for the deaf, . . . tuberculosis hospitals," the state orthopedic hospital and other agencies; and "coordinate their educational activities. . . ." In Florida the Act provides for cooperation between the county boards and superintendents of public instruction, the State Crippled Children's Commission and the State Board of Social Welfare. Cooperative arrangements are provided for in California with the Bureau of Vocational Rehabilitation and the State Employment Service, and recently all public and private agencies have organized the State Council on Coordination.

One of the newer features of recent laws is that of promotion. In California the State Superintendent of Public Instruction is authorized to "promote and direct" special education in the state. A goodly portion of the first appropriation of the Oregon law is to be expended to survey the problem of special education and to "facilitate" its operation. In Illinois the Commission for Handicapped Children gives all its time and services to the promotion and coordination of the efforts of other state agencies concerned with physically and mentally handicapped children under nineteen years of age. A Crippled Children's Commission was set up by the 1941 legislature in North Dakota to advise, assist and cooperate with the State Welfare Board which administers the federal-state treatment program for crippled children.

The Acts of Florida and Oregon have provisions for the acceptance of any federal funds which may be made available later for special education. This is in anticipation of the passage by Congress of the Boland Bill, House Resolution No. 1825, or some other similar future Act. This makes a total of six states having such an anticipatory provision in their statutes relating to special education.

In 1924, New York confronted with the problem of several state governmental departments dealing with different types of the physically handicapped and with the several differing services to the same type, created a special legislative study commission to see what could be done to integrate properly all these services. The result was that the legislature during the next year provided by law an Advisory Commission for Physically Handicapped Children. On this Commission there was placed the State Commissioner of Education as chairman, the State Industrial Commissioner, the commissioners of health, and welfare. The administrative officer was chosen, according to the act, by the Commissioner of Education. This Commission was empowered to stimulate all public and private efforts designed to relieve, care for, cure or educate physically handicapped children, to rehabilitate persons over fourteen years of age, to plan cooperation between the industrial commission, the department of labor, the bureau of employment and the department of education, to arrange differences between departments, to provide therapeutic treatment, to make necessary administrative rules and regulations and to maintain a register of physically handicapped children.

Wisconsin, which has been studying this problem of confused administrative services to the physically handicapped, made several legislative steps to improve the situation during the past five years. In 1939 it provided by law that: "There is created in the State Department of Public Instruction a bureau of handicapped children. . . . The state superintendent of public instruction shall appoint a person with the status of assistant superintendent to serve as director for the bureau. . . . The director is responsible for the services . . . for children who are crippled, blind, partially seeing, deaf, hard of hearing, defective in speech, cardiopathic, malnourished, otherwise physically handicapped, or who are mentally handicapped. . . . The director shall appoint . . . a supervisor of the services for children who are deaf, hard of hearing, blind, partially seeing or have defective speech; a supervisor of the services for children who are crippled or otherwise physically handicapped; a supervisor of the services for children who are mentally handicapped. . . ." This service includes discovery, treatment and education and is authorized to receive federal funds and cooperate with the federal government under the social security act or any federal act which may be passed in the future providing any services for such handicapped children.

Illinois has a Commission on the Handicapped which gives its full time to the problems of research and coordination in the field of the handicapped. The Ohio Children's Code Commission is recommending a similar law to the 1943 legislature.

CONCLUSION

It is the purpose of all state societies for crippled children to coordinate the interests and services of all agencies, public and private, lay and professional, which deal with the cripple. They work to overcome the public prejudice against disability and deformity. They attempt to achieve cooperation by creating public understanding of the needs and abilities of the crippled. They hold conferences with all such agencies; seek to have the problem of the cripple discussed on the programs of conventions held by social workers, nurses, physicians, health agencies, physical therapists, occupational therapists, educators and employers. The National Society urges them to assist in the organization of state councils on coordination.

Many state societies during the last year have initiated and conducted area institutes on the cripple. In these the State Administrators of Services for Crippled Children, Vocational Rehabilitation, Workmen's Compensation, and Employment Services have been brought before local audiences gathered from 5 to 10 counties to answer specific questions put to them by the state society. These questions deal with the provisions of the acts under which they operate their services, with the methods by which clients can receive the benefits of the existing laws and services, with ways of cooperating intelligently with these public agencies and with methods of improving and extending such services.

To safeguard laborers who cannot secure personal insurance, industrial insurance has been established. Small groups of fifty or more employees may be thus covered with insurance. The initial premium is based upon the industrial classification of the employer and modified later according to the actual accident experience established by the individual company. Age, sex, color or physical condition do not serve as restrictions.

Although individuals are not required by the insurance company to submit to medical examinations, this insurance system does bear directly on the employment opportunities of the physically handicapped. Many employers maintain that the disabled person, because of his physical defect, is more susceptible to injury and therefore increases the "experience rating" and the premium the employer has to pay for such insurance. Because of that presumption the employer feels he cannot hire the disabled. The trend of thought and effort on the part of agencies serving the physically handicapped is to keep strict account of the accident experiences of their clients for comparison with that of normal employees. Already there is evidence to prove that it is lower than for the physically normal. When this is established on a firmer basis it can be used in overcoming the mental bias of the employer for the disabled. State societies are urged not only to promote this type of insurance but to assist in persuading employers to make full use of its protection.

Another constructive trend in social thinking is toward a national scheme of industrial insurance. Efforts are being made to establish hospital and health insurance on a nation-wide basis, and old-age and unemployment insurance protection are already administered under federal statutes. What valid objection is there to a similar federal or national program of industrial insurance? State councils on coordination can use their potential power in bringing into being the universal acceptance of such a program of industrial insurance.

We are beginning to believe that we are just well started on a constructive legislative program in behalf of the physically handicapped. And we are beginning to realize, also, that when all of us interested in the physically handicapped put our shoulders at the same time to any wheel which is turning for the benefit of all the handicapped, that wheel turns faster. Such organized effort means that the 120,000 deaf persons, the 3,000,000 with impaired hearing, the 117,000 blind, the army of persons with tuberculosis, the 365,000 crippled children and the 2,000,000 other persons with orthopedic defects, and many others, will share increasingly in the resulting improved general social welfare.

Orthopedic Surgery Between Two Wars

Ames A. Dickson, M. D.

At a time when human energy and resources are being consumed on a scale never before imagined in the frenzied production of instruments of destruction, carnage and chaos, it is easy to agree with the cynics and pessimists who contend that there is no real progress in the world and that what we call civilization is completely doomed. But if we ponder more carefully the things we know best and the changes that have been wrought in our thinking as well as the environment in which we live, we know that this is not true. Change is eternal, the law of life, and those changes that endure are always for the better. Sometimes progress is so gradual that we are not aware of it; sometimes it is hastened by spectacular and stimulating events.

It is well, especially when immediate happenings are conducive of despair, to stop and give our attention to the changes for the better, the evidences of progress, in whatever is most familiar to us, thus to gain assurance and faith that still greater improvement will be forthcoming in the future. With all the deplorable devastation of a world war, the resourcefulness and enterprise of human beings are then stimulated to their highest peak of efficiency and result in advances, particularly in scientific fields, that might not be produced in decades of peacetime effort paced at a slower tempo. As someone has said, "War is an evil thing but has done good, like a hormone, in activating the whole chemistry of the nation."

In no field of human activity is this more true than in medicine.

—*From J.A.M.A., Oct. 10, 1942.*

Schools Approved for Training Physical Therapy Technicians

By the Council on Medical Education and Hospitals of the American Medical Association

Name and Location of School	Medical Director	Technical Director	Entrance Requirements *	Duration: Regular Course	Duration: Emergency Course	Time of Admission: Regular Course	Time of Admission: Emergency Course	Tuition**	Certificate Diploma Degree **
Children's Hospital, Los Angeles	Steele F. Stewart, M.D.	Miss Lily H. Graham	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	12 mos.	6 mos.[1]	Feb. and Sept.	Feb. and Sept.	$200 R $200 E	Diploma R Certificate E
Stanford University, Stanford University, Calif.	William H. Northway, M. D.	Miss Catherine Worthingham, A.B., M.A.	(a) R. N. (b) Phys. educ. major (c) 3 yrs. coll.	12 mos.[1]	7 mos.[1]	Jan. and June	Jan., Mar. June and Sept.	$429 R $286 E	Certificate or B. A.
Walter Reed General Hospital, Washington, D. C.	B. A. Strickland, Jr. Capt., M. C.	Miss Emma E. Vogel	Phys. educ. major	.....	6 mos.	.....	Quarterly	None	Certificate
Northwestern University Medical School, Chicago	John S. Coulter, M. D.	Miss Gertrude Beard, R.N.	(a) R. N. (b) Phys. educ. major (3) 3 yrs. coll.	9 mos.[1]	6 mos.[1]	Oct.	Jan. and July	$200 R $200 E	Certificate
Bouve'-Boston School of Physical Education, Boston	Arthur L. Watkins, M.D.	Miss Constance K. Greene	High sch. grad.	3 yrs. 4 yrs.[2]	6 mos.	Sept.	Aug.	$400 yr.	Diploma or B. S.
Harvard Medical School, Boston	Frank R. Ober, M.D.	Miss Janet B. Merrill	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.[3]	9 mos.	6 mos.[1]	Sept. and March	Sept. and March	$200 R $200 E	Certificate
Boston University, Sargent College of Physical Education, Cambridge, Mass.	Louis Howard, M.D.	Mrs. Lucille W. Fuller	2 yrs. coll.	2 yrs.	[4]	Oct.	[4]	$547	Certificate and B S.
University of Minnesota, Minneapolis	M. E. Knapp, M.D.	Miss Sara E. Kollman, R.N.	(a) R. N. (b) Phys. educ. major (c) Medical technology grad. with B.S. degree	12 mos.[1]	.....	June and Sept.	.....	Univ. fees	Certificate
Mayo Clinic, Rochester, Minn.	Frank H. Krusen, M.D.	Mr. Carl O. Moe, R.N.	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	.....	6 mos.[1]	.....	Jan. and July	None	Certificate
St. Louis University School of Nursing, St. Louis	Alexander J. Kotkis, M.D.	Sister M. Consella, R.N.	High sch. grad.	4 yrs.[1]	.....	Jan. and Sept.	.....	$250 yr.	B. S.
University of Buffalo School of Nursing, Buffalo	George G. Martin, M.D.	Miss Edna Beaver, R.N.	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	12 mos.[1]	6 mos.[1]	Feb. and Sept.	Feb. and Sept.	$425 R $375 E	Certificate
Hospital for Special Surgery, New York City	Kristian G. Hansson, M.D.	Miss Ethel M. Willmer	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	9 mos.[1]	6 mos.[1]	Sept.	Sept.	$300 R $300 E	Diploma
D. T. Watson School of Physiotherapy, Leetsdale, Pa.	Jessie Wright, M.D.	Miss Dorothy Lovdahl	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.[5]	2 yrs.[1]	6 mos.[1]	Sept.	Jan. and July	None R $200 E	Diploma R Certificate E
Richmond Professional Institute of the College of William and Mary, Richmond, Va.	Thomas W. Wheeldon, M.D.	Miss Alice Jones	(a) R. N. (b) Phys. educ. major (c) Coll. grad. (d) High sch. grad.	9 mos. 4 yrs.	....	Feb. and Sept.	.....	Coll. fees	Certificate or B. S.
University of Wisconsin Medical School, Madison	Ernst A. Pohle, M.D.	Miss Margaret Kohli, B.S.	(a) R. N. (b) Phys. educ. major	12 mos.[1]	6 mos.	Feb. and Sept.	Feb. and Sept.	Univ. fees	Certificate

Name and Location of School	Medical Director	Technical Director	Entrance Requirements	Duration Regular	Duration Emerg.	Time of Admission	Tuition	Certificate Diploma Degree
College of Medical Evangelists, Los Angeles	Fred B. Moore, M.D.	***	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	12 mos.	.....	Jan. and July	$ 225	Certificate
Barnes Hospital, St. Louis	Frank H. Ewhardt, M.D.	Mrs. Lucile B. Fitts	(a) R. N. (b) Phys. educ. major (c) 2 yrs. coll.	9 mos.	.....	Feb. and Oct.	$200	Certificate
New York University, New York City	William Bierman, M.D.	G. G. Deaver, M. D.	(a) R. N. (b) Phys. educ. (c) 2 yrs. coll. major	9 mos.	.....	Sept.	$396	Certificate, B. S. or M. S.

* Courses are so arranged that any of the entrance requirements (a, b, c or d) will qualify students for
** R = Regular course; E = Emergency course.
1. Male students are admitted.
2. Four year course leads to B. S. degree from Simmons College.
3. This group admitted to emergency course only.
4. Emergency course offered in cooperation with Harvard Medical School.
5. Only those with three years of college are admitted to emergency course.

***We do not have at present the name of the technical director for this physical therapy school.

Reprints

"Physical Therapy as a Vocation"

"Approved Schools of Physical Therapy"

"Training of Physical Therapy Technicians"

The Constitution of the American Physiotherapy Association

Code of Ethics and Discipline of the American Physiotherapy Association

The Blue Booklet, "The American Physiotherapy Association is Organized to Serve"

"What Does a Physical Therapy Department Contribute to a Hospital?"

"A Study of Physical Therapy Costs in Industrial Medicine"

"Role of the Physical Therapist in the Care of the Crippled Child"

"Ethics and the Physical Therapy Technician"

"Bulletin of Information, American Physiotherapy Association"

List of National and Chapter Officers of the American Physiotherapy Association

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Wishing You a Merry Christmas and a Happy New Year!

At the Round Table on Rehabilitation which was held in New York City during August 1942, rehabilitation was defined thus: "Rehabilitation is the planned attempt through the use of all recognized measures under skilled direction to restore those persons who, because of disabilities, do not assume to the greatest possible extent and at the earliest possible time that place in the productive stream of society which they are potentially capable of assuming."

In order to rehabilitate an individual it is necessary for the physical therapy technician, as well as others concerned in the care of the patient, to consider the patient as a whole and not to feel that her responsibility is limited to the physical therapy treatment.

G. Canby Robinson, M. D., of Johns Hopkins University School of Medicine, has written as follows: "The great bulk of illness . . . reveals itself to the patient as an inability to carry efficiently the responsibilities of his family, of his work or of other situations he is called on to face. It is this sense of inability from which comes fear or worry, uncertainty and a feeling of insecurity. The patient is primarily concerned with being restored to his accustomed place in society whether he consciously realizes it or not. For this reason an understanding of the conditions and obligations of the accustomed place in society to which each patient hopes to be restored is a requirement of medical practice. This concept should be appreciated by the medical student and should be incorporated into his attitude toward an understanding of medical practice early in his clinical training." This same concept should be appreciated by the physical therapy technician and should be incorporated into her training.

If we are to meet the great need during and after this war, the greatest cooperation with all agencies, both public and private, in giving total care to the patient is absolutely essential. A splendid start has been made by the representatives of those organizations which met in New York City. However, to make it a success each member of all these organizations must work toward this end and not leave it to the heads of the organizations to carry on. We as individuals can do our part by being ready to cooperate with the Council on Rehabilitation. Chapters can be ready to cooperate by (1) knowing what legislation there is in the state affecting the handicapped individual; (2) what agencies there are in the state or local community which render service to the handicapped; (3) whether there is a coordinating council in the community, and (4) if so, whether physical therapy is represented on this council. It is only through the combined efforts of all existing agencies that a complete program of rehabilitation can hope to be successful.

Military Status

A bill H. R. 7633 has been introduced into the House of Representatives. This bill provides for increase of pay for nurses and also for military status for physical therapy aides and dietitians. A copy of the bill as sent out by the Publications Office does not contain the provision for physicial therapy aides and dietitians but a section is being written into the bill at the suggestion of the War Department. Full details will be given to the membership as soon as they are obtained.

Physical Therapy in the Navy

Notice concerning women physiotherapists in the Navy (authorized by Randall Jacobs, Rear Admiral, U.S.N., Chief of Naval Personnel):

"A limited number of women physiotherapists will soon be required by the Bureau of Medicine and Surgery of the Navy. These physiotherapists will be included in the Women's Reserve, the WAVES. Although it must be stressed that the classification of these physiotherapists has not yet been determined, it is appropriate that those physiotherapists who are interested apply for appointment or enlistment in the WAVES at the Office of Naval Officer Procurement in their district. At the time of application it would be well to notify the American Physiotherapy Asso-

ciation office, 495 California Avenue, Palo Alto, California, in order that you may be informed of further developments."

Male Physiotherapists in the U.S. Naval Reserve (authorized by Rear Admiral Ross McIntire, Surgean General, U. S. Navy):

"Professionally qualified male physiotherapists, between the ages of 17 and 50, who are physically and otherwise qualified may enlist directly in the Hospital Corps through the U. S. Naval Reserve.

"Graduate physiotherapists with adequate professional experience, who are 23 years of age and otherwise qualified, may be rated on enlistment as Pharmacist's Mate, second class. Graduation is not a requirement and men with extensive professional experience who are judged qualified by a medical officer may also receive the rating of Pharmacist's Mate, second class. Qualified physiotherapists between the ages of 20 and 23 years may be rated on enlistment as Pharmacist's Mate, third class. Experienced assistants in physiotherapy techniques, if judged qualified by a medical officer, may be enlisted as Hospital Apprentices, first class or second class.

"Physiotherapy technicians, who may be rated on the basis of their civilian professional qualifications, would be required to qualify in the general duties of a hospital corpsman in order to be promoted to a higher rating. While a physiotherapy technician might be assigned to a duty where he would practice his profession, it is a basic policy to require all hospital corpsmen to be prepared for the general duties of his rating. Physiotherapy technicians so qualified would be eligible, after proper service, for promotion to the ratings of Pharmacist's Mate, first class and Chief Pharmacist's Mate. Chief Pharmacist's Mates may be appointed to the warrant grade of Pharmacist (Temporary), to the commissioned grades (Temporary) of Ensign, Lieutenant (junior grade), and Lieutenant, in the U. S. Naval Reserve.

"Enlistments, with appropriate ratings, can be accepted at any of the U. S. Navy Recruiting Offices. A booklet on 'The Hospital Corps of the United States Navy' will be mailed to interested persons upon request to the Bureau of Naval Personnel, Washington, D. C."

Changes in Civil Service Requirements

Several important changes have been made in Civil Service requirements. These changes were released on September 1, 1942, and supersede previous releases. In making application for service, be sure to get the latest information from your Civil Service headquarters. These are No. 259 (Unassembled) for Student and Apprentice Physical Therapy Aides, and No. 260 (Unassembled) for Physical Therapy Aides. The need for qualified personnel is still great and these new requirements may make you eligible. Check on them today! An examination is no longer necessary. Applicants must have graduated from a school approved by the American Physiotherapy Association prior to 1936 or a school approved by the Council on Medical Education and Hospitals of the American Medical Association since that date.

1943 Conference

There seems to be much in favor of holding an annual conference in 1943 with the theme "rehabilitation." It has been suggested that it be held in the East, near a large population center, but preferably in a camp or college campus. The officers would very much appreciate suggestions from the individual members and chapters as to their interest in such a conference and any particular suggestions they would like to have included.

Scholarships

The National Foundation for Infantile Paralysis has granted the American Physiotherapy Association $5000 to provide 50 scholarships in physical therapy for properly qualified students. Application should be made to Evelyn Anderson, Secretary, American Physiotherapy Associaton, 495 California Avenue, Palo Alto, California.

In the last issue of the REVIEW a letter and editorial comment on the subject of uniforms for physical therapy aides were published. Any editorial unless signed is the product of the REVIEW, and the responsibility for it is entirely with the editor-in-chief. The subject of uniforms is a very minor one and so easily rectified that it hardly warranted comment, except that the wearing of a uniform which does not place the aide in the professional category to which she belongs was a serious matter to many of the aides. This was brought out in many letters which we have received as comments on the editorial. The profession of physical therapy has inherited the privilege of wearing a uniform, the same as a nurse, and therefore has a right to a uniform with insignia which will command the respect due to all members of such a high-ranking profession. Our girls are proud to serve their country as physical therapy aides. We salute them, and we know that they have been and will continue to carry on to the very best of their ability.

Membership Directory

The new directory is ready now at the price of 10c. Place your order with your Chapter Treasurer now! Members-at-large: Place your orders with the National Office, sending the money with your order to facilitate clerical work in the office.

1942 Conference Discussions

The 1942 Conference Discussions are being prepared for publication and should be ordered now. A limited number of these will be printed —enough to cover only those orders received previous to the date of printing. There will be *no* extra copies.

1941 Conference Discussions

Several requests have been received from libraries and individuals for copies of the 1941 Conference Discussions. If you have finished with your copy, please inform the National Office so that these requests can be filled.

Ohio Chapter

The Ohio Chapter held an all day meeting on Saturday, November 14, 1942. The morning was devoted to visiting various physical therapy departments of hospitals in Cleveland, and the afternoon was spent in demonstration of technic and discussions on "Present Day Methods of Treating Poliomyelitis."

National Foundation for Infantile Paralysis

The National Foundation for Infantile Paralysis recently made the following announcement:

"The fact that 1942 has been a light year for infantile paralysis has allowed the country to change over with a minimum of difficulty from the older method of treatment of the disease, particularly in the early stages, to the Kenny method. Up to the end of the first week of October there had been but 2,834 cases reported in all of the United States. This is in comparison with 6,850 for 1941 and 6,918 for 1940 during the same period. It would have been totally impossible to supply nurses and physical therapy technicians trained in the Kenny method for an additional 4,000 or more cases. As it is, in many parts of the country only insufficiently trained persons or those with no training in this method had to do the best they could.

"Training facilities have been established by the National Foundation as rapidly as possible. Today doctors, nurses and physical therapists can go to any one of six places and receive good instruction. It is no longer necessary for everyone to go to the University of Minnesota. While Miss Kenny and her Australian assistants work only at that institution, each of the other places has trained personnel, associated with excellent educational institutions, in charge of the courses.

"Aided by the Foundation, teaching programs are conducted at the following places, and information as to costs, dates of courses and admission policies can be secured directly from these schools and universities:

School of Health (Women)
Stanford University, California
Catherine Worthingham,
Director.

Childrens Hospital Society
University of Southern California
Los Angeles
Lily Graham, Technical Director, School of Physical Therapy.

University of Minnesota,
Minneapolis
Director, Center for Continuation Study

Northwestern University Medical School,
Chicago
Dr. John S. Coulter, Chairman,
Department of Physical Therapy

D. T. Watson School of Physiotherapy,
Leetsdale, Pennsylvania
Dr. Jessie Wright, Director

Physical Therapy Post-Graduate School
Georgia Warm Springs Foundation
Dr. Robert L. Bennett, Director

"Plans are already under way to add a seventh training center in New York City. It is hoped instructional courses will be available on or about December 1. Here in New York, several hospitals and schools of physical therapy will join forces under the direction of our Greater New York Chapter, thereby using to the greatest advantage the wealth of clinical and teaching material available locally."

The Gold Key Award of 1942

The Gold Key award of our Congress is an accolade of distinction presented annually at this time to one or more persons who by his or their special contributions to the science of Physical Medicine are recognized for their par-

ticular value to our times and the healing art. The order of the Gold Key of the American Congress of Physical Therapy numbers among its distinguished members persons from every land whose services have been the means of alleviating suffering and raising the stature of our practice to a level commensurate with the dictates of science and the highest demands of our discipline.

It is timely to recall that throughout the ages no other group more than our profession has so persistently fought and sacrificed for health and opposed the destructive forces of disease by a program of construction which awarded highest merit to those who contributed to the best means of protecting the weal of our fellow men. The Congress under the direction of its governing body, the officers of this organization, is pleased to do honor to a person whose sacrifices, courage and persistent efforts have brought new hope, considerable relief and even the promise of marked improvement to a host of infants, children and adults suffering from a scourge that heretofore challenged our best classical methods of treatment. In the hands of this pioneer, old procedures in our armamentarium have been used and suggest that a new orientation in their application in relation to spastic and paralytic structures has been created.

Citation.—Elizabeth Kenny, age 54, native of Australia and graduate registered nurse, began the study of infantile paralysis and her special contribution thirty years ago. She was then serving as a nurse subject to service in the interior of Australia, a service that is designated as a "bush nurse," because it delegated the work to the wastelands, scattered homes and primitive abodes of a population that saw little of the physician and were often entirely dependent on a nurse. Her initiative and practical turn of mind were her richest assets in the presence of a series of clinical crises that would have called for the highest endeavors of our profession. Her ingenuity turned the only tools of nature at her disposal into curative weapons. Perseverance, imagination and careful observation fashioned these physical tools into a creative and new therapeutic approach to the management of anterior poliomyelitis, and an extraordinary experience which hardened body and intellect to resist the tragedies of life in the bushlands helped to formulate her future program to a clarity that eventually won for her the support of governmental and medical bodies in Australia. She came to America at the expense of the Australian government for the purpose of furthering her research and in the hope of disseminating her special experience for the greater good of mankind.

Her success in this country is a tribute to three American physicians, Drs. Wallace H. Cole, Miland E. Knapp and John F. Pohl. Their cooperative endeavors were and continue to be of such a high standard that their names will always be coupled with the successful proof of the treatment. The work carried out in the department of Physical Therapy and under the supervision of the Orthopedic Service at the University of Minnesota established the fact that out of a comparatively large series of acute cases, all became free of contractural deformities, all were free from abdominal and back paralysis and only a small fraction retained a residual paralysis of the extremities. This is but a beginning of a vast promise bearing the potentiality of good to an affection whose morbidity has in the past been the story of one of our greatest tragedies. To Elizabeth Kenny is accorded the special distinction of being the first female in the history of our Congress to receive the Gold Key Award, and to Drs. Cole, Knapp and Pohl, honorary mention for services of the highest quality.—*From* ARCHIVES OF PHYSICAL THERAPY, *October 1942.*

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ABSTRACTS

John S. Coulter, M.D.

Follow-Up Study of Physical Therapy Applied at Home for Arthritis

J. V. Treusch, M.D., Fellow in Medicine, Mayo Foundation, and F. H. Krusen, M.D., Section on Physical Therapy. In Staff Meetings Mayo Clinic, 17:33:524, October 7, 1942.

Physical therapy has come to play one of the central roles in the general therapeutic program outlined for the patient who has chronic arthritis. Home treatment with physical measures finds its place either as a less elaborate continuation of the beneficial measures started in the Section on Physical Therapy or as a primary home regimen of simple physical measures supplemented, whenever possible, by professional treatments once or twice weekly. For several years now a plan has been in effect at the Clinic whereby every arthritic patient seen by a physician in the Section on Physical Therapy is prescribed for individually and is given a minimum of one instruction treatment by a trained technician. In addition, he is given on dismissal detailed and exact written instructions concerning methods to be used at home. In other words, physical therapy is prescribed for application at home as individually and specifically as any other medical or therapeutic procedure.

When the total of the patients with rheumatoid arthritis who had two or more instruction treatments is considered we see that the 74.4 per cent of this group who received benefit is significantly greater than the 56.1 per cent receiving benefit of the group

who had only one instruction treatment.

Likewise, according to this criterion, in the case of osteoarthritis forty-three (62.3 per cent) of sixty-nine patients who arranged for only one instruction treatment were benefited and nine (69.2 per cent of thirteen patients who had two or more instruction treatments were benefited. This seemed to indicate that it is not quite as important, though still of some possible value, to encourage the patients with osteo-arthritis to take an extra instruction treatment or two. The practical conclusion here is that it is certainly worth while for the patients, especially for those who have rheumatoid arthritis, to take more than just one instruction treatment and we are justified therefore in encouraging the patients to do so.

Rehabilitation of Head Injuries

Wylie McKissock, M. S., F. R. C. S. In Practitioner, CXLIX:890:75, August 1942

The need of adequate facilities for the rehabilitation of patients who have sustained a cranio-cerebral injury is very great, and that attention has recently been focused upon this subject is one of the more fortunate aspects of the present world war.

It must not be forgotten that rehabilitation begins with return to consciousness on the part of the patient. In the early hours and days of recovery much may be done towards achieving the best end-result, and to this purpose there must be a team of individuals at work together, each with his or her own field, and each ready to play the appropriate part of the correct moment.

Nurses.—Nurses should be specially selected, at any rate as regards the senior members of the staff.

Porters or male nurses.—Such persons are often required and should realize that "main force" is the last of their requirements. They may in the end be required to prevent violence on the part of the patient, but they should use physical restraint in as gentle and reasonable a manner as possible.

Masseurs.—The masseur is a most valuable member of the necessary team from the early days of recovery until the end of the period of stay in hospital.

Occupational Therapist. — Although occupational therapy plays a part in the rehabilitation of patients with head injuries, it is perhaps not as important a part as that played in other branches of neurological surgery. During the earlier period of recovery, while the patient is still confined to bed, some forms of occupational work may be given, compatibile with the degree of mental ability of the patient, mainly with the idea of stimulating interest and occupying time.

The Almoner. Once again this much overworked profession must be called in to assist. The home circumstances, the financial position at the moment and for the future, the question of compensation, the return to the original work or to a new trade, the continuance of physical therapy or occupational therapy, and the place of final convalescence, require the urgent attention, professional experience and understanding of the fully qualified almoner.

Medical Staff.—There can be little doubt that the cranio-cerebral injury falls within the province of the neurosurgeon and the neurologist, for, although the treatment is seldom actively surgical, the problems which frequently arise require that attention to detail and that understanding of the physiological principles of the working of the central nervous system in which the modern neurologist and neurosurgeon are trained over a period of many years.

The patient should from the first be led to believe that he will recover satisfactorily, for this is true of by far the great majority; and the minority who will retain some permanent defect must have their minds led into the most suitable channel.

Once free of headache, nausea, vomiting or giddiness, which in most cases is only a few days from the receipt of injury, the patient is ready for the next stage, and here the masseur and occupational therapist are required. Boredom is a fatal thing in the case of the recovering head injury and must be studiously avoided. Although it is bad to overwork the injured brain it is good to exercise it gently, and from the beginning of this stage the patient should lead an organized life designed to make each day pass as pleasantly as possible.

When the patient begins to leave his bed, which may be a matter of a few days or many weeks, depending upon the nature of the injury, the need for an organized time-table throughout the day becomes more apparent. Every effort should be made to stop the aimless wandering about the ward, the hospital or its grounds by recovering patients.

After the first few days of regaining their feet, light physical exercise may well be permitted and encouraged, gradually increasing both in extent and in vigour as the patient tolerates it. Definite duties should be assigned to such convalescents, either in the ward or in some other part of the building or hospital grounds. Due precaution must be taken at this period that no untoward symptoms occur and that the patient does not become excessively tired.

Postabortional Sepsis

E. W. Rebbeck, Pittsburgh. In Amer. J. Surg., March 1942.

From July 1938 through July 1941 Rebbeck used ultraviolet irradiation of autotransfused blood as an adjunct to surgical intervention in the preoperative treatment of 17 and the postoperative treatment of 4 patients with postabortional sepsis.

The results strongly indicate the preventive value of irradiating autotranfused blood. The patients were discharged from four to eight days after curettement.

Discussion on Skin Diseases of the Ear

Dr. Reginald T. Brain. In Proc. Royal Soc. Med., XXXV:8:519, June 1942.

Infections of the external auditory meatus often produce secondary lesions in the path of the purulent discharge, and these lesions are unlikely to resolve until the otitis has cleared up. This is the task of the aural surgeon, and, because of anatomical factors, it is a difficult one, especially when edema closes the meatal orifice.

Physical therapy.—Otologists are familiar with methods of ionization and are no doubt aware that although the penetration of ions is slight the surface effect of the solutions employed is greatly intensified. In consequence eczematous lesions are usually aggravated by ionization. Although lesions of the meatus can be treated with local ultraviolet light by quartz applicators and a Kromayer lamp the greater beneficial effect of general ultraviolet ray therapy in chronic infections is often unsought. It is not generally realized that a drying source of heat is most comfortable and healing in the treatment of boils, and use should be made of infra-red rays, diathermy or X-rays.

Application of Heat for Shock

From Queries and Minor Notes, J.A.M.A., 119:11:917, July 11, 1942.

To the Editor:—Although I prescribe conservation of body heat in the treatment of shock, this treatment is not compatible with my understanding of the physiologic basis of shock therapy. I realize that a subnormal temperature is common in shock; however the body temperature can safely fall much lower than we see even in shock. If our chief object in the treatment of shock is to maintain ample blood supply to the brain and internal viscera, why should we bring this blood to the periphery by applying blankets and external heat? It would seem to me more advantageous to allow the body surface to be cool so that the blood supply could be shifted to the internal organs, even though it would result in a slight lowering of the body temperature. I would be interested in your opinion on this subject.

I. R. Morrison, M.D., Atchison, Kan.

ANSWER.—The principle of conservation of body heat in the treatment of shock is established on the extensive practical studies made during the World War. Exposure to cold of soldiers in shocks had a bad effect, and benefit was observed from the application of heat.

Superficially it may appear that cooling of the body of a person suffering from shock would be advantageous for the reasons stated in the inquiry; however, relatively little blood can be expressed from the skin by cooling because of the peripheral vasoconstriction present in shock. In fact, if cooling of the surface of the body is attended by a fall in body temperature of as little as 0.5 degree, shivering may be induced. This would greatly increase the expenditure of energy and increase the blood flow through skeletal muscle, which would be distinctly dangerous to the shocked person. Furthermore, as the temperature of the body is reduced, hemoglobin holds oxygen more firmly. This would aggravate the anoxia that is present in shock.

Excessive warming of the body is also to be avoided for the reasons outlined in the question. The practical application of the principle of conservation of body heat in the treatment of shock is, therefore, not as simple as it appears. It is probable that the patient in shock unless his body temperature—not skin temperature—is below normal does not require an environmental temperature above comfortable levels. The coldness of the skin, a common indicator for the use of heat, is due to peripheral vasoconstriction. The use of extreme heat is undoubtedly harmful, and experimental evidence fails to show harm from cold. (Blalock, Alfred, and Mason, M. F.: A Comparison of the Effects of Heat and Those of Cold in the Prevention and Treatment of Shock, *Arch. Surg.* 42:1054, June 1941). A second practical rule to follow in governing the covering and warming of persons in shock is to keep them warm and dry.

Treatment of Lymphogranulomatous Strictures of the Rectum with Short Wave Diathermy

Richard T. Shackelford, M.D., and J. Arthur Weinberg, M. D. In Amer. J. Surg., LVII:1:83, July 1942:

Almost every form of chemical, biological, radiological, electrical, surgical and physical treatment has been used without very promising results after the secondary manifestations have developed. Recent reports have offered attractive results with the use of the sulfonamides but our experiences with these have not been good when used late in the disease. We decided to treat some of our rectal strictures with diathermy alone. A short wave machine was used. A metal plate connected to one pole of the machine was applied to the lower abdomen and the other pole was connected to a Hegar dilator which was inserted into the strictured area. The largest dilator that could be inserted without causing the patient too much discomfort was used. Treatments were given from two to six times per week for a period of twenty minutes each, as much current being used as the patient could tolerate. Five patients were treated in the above manner and two patients were used as controls.

Two patients were used as controls and one of these showed the most marked improvement of any, and demonstrated little evidence of recontraction of her stricture. The other control showed temporary improvement at the end of her treatment but within three and one-half months the stricture had recurred to the same caliber as before therapy was begun.

Conclusions

From these facts we conclude that diathermy treatment per se to rectal strictures of lymphogranulomatous etiology, in our experience, offers very little if any curative effects. We believe that what benefits did result are primarily the effect of more frequent and prolonged dilatations that we had used in the past.

Management of Rheumatic Disease in the Forces

Oswald Savage, M. R. C. P. Acting Lieut.-Colonel, R. A. M. C. In Brit. Med. J. No. 4263:336, September 19, 1942.

Fibrositis

This formed by far the largest group, being over 52 per cent of the total number of rheumatic cases. The term "fibrositis" as it is usually employed means a nonarticular involvement of the soft tissues, most commonly the sheaths of the muscles, the fascial layers, and other fibrous supporting tissues of the locomotor system. Cases of fibrositis should not as a rule be admitted to hospital unless they require manipulation or intensive treatment. They should be capable of being rendered symptom-free by short periods of physical therapy, and Army life with its regulated activities and adequate food is often good treatment for them. Lowering the man's medical category was delayed until treatment had been tried. In the majority of cases it was found to be unnecessary.

Lumbar Fibrositis (40 cases).—Fourteen of these had acute lumbago and were admitted to hospital. Initial treatment in many cases was by local infiltration of 2 per cent procaine. This was followed by daily heat and exercises. As soon as possible these men were put in an exercise class.

Trapezial Fibrositis (30 cases).—These men complained either of post-occipital pain and headache or of stiffness across the shoulders accentuated by wearing equipment and by drill.

Gluteal Fibrositis (26 cases).—It is difficult to differentiate these cases from the sciatic group as they both form part of the sciatic syndrome.

Shoulder-girdle Fibrositis (14 cases).—The symptom here was of pain radiating from the shoulder down the outer side of the arm, often to the fingers, with some pain on full movement of the joint.

Postural Backache (40 cases).—This is a relatively common condition. During the early weeks of training the men report sick with backache. These men were all treated by remedial exercises. Those not admitted were recommended to be sent to the Army physical development center.

Sciatica (24 cases, all admitted to hospital).—Cases of sciatica occurring in units should be admitted to hospital as soon as possible. After a period of rest, infiltration with local anesthetic was carried out and followed by physical therapy. In 3 cases sciatica of long standing had proved resistant to physical therapy elsewhere. Manipulation was followed by restoration of full function. The remaining 10 cases made slow but steady progress. They were treated by rest, splinting, and physical therapy. When fit they were transferred to a convalescent depot for further exercises.

Ankylosing Spondylitis (*Marie-Strümpell Disease*) (14 cases).—This is a large proportion for a disease which is counted a rarity. It occurs almost exclusively in young men, and therefore, in the age group which was being examined. They were recommended for discharge from the Army.

Rheumatic Fever (4 cases).—The average age, 25 years, of this small group is high and in each instance the attack was a primary one.

Nonspecific Infective Arthritis (4 cases).—In these men joint pain and moderate effusion were associated with a focus of infection.

Gonococcal Arthritis (3 cases).—Two of these cases were early, with urethral discharge, and were transferred.

Sacroiliac Strain (3 cases).—All were traumatic in origin.

Muscle Spasm in the Acute Stage of Infantile Paralysis: As Indicated by Recorded Action Current Potentials

R. Plato Schwartz, M. D., and Harry D. Bouman, M. D., Rochester, N Y. In J. A. M. A., 119:12:-923, July 18, 1942.

Action currents are among the means most suitable for recording extremely minor contractions of muscle in situ. The rigid principles that define the technic of this method were applied to the study of patients: (1) 7 with infantile paralysis, (2) 3 with spastic paralysis and (3) normal subjects for control.

In all instances oscillographic records of muscle action currents were made through a four stage amplifier. This amplifier has a balanced in-put system which reduces those potentials not generated between the electrodes applied to the skin overlying the muscle under investigation. Stetson and Bouman have shown that it is quite possible to make records of different muscles without significant interference from the related antagonist.

Spasticity

A particular pattern of action current records is established as definite evidence of muscle spasm. In some instances spasticity can be recorded in muscles at rest. However, Hoefer has revealed that even in spastic paralysis it is usually possible to find a position of complete relaxation in which characteristic action currents are almost completely absent. Independent of cause and degree, muscle spasm in a muscle will be revealed in the action current records made on passive movement of the muscle. Under this condition the muscle does not actively contract, so there is no action current of voluntary contraction in such a record. The most common way of evoking spasticity in a muscle is by a fairly sudden stretching of the muscle.

Conclusions

The authors' results then seem to justify the following conclusions:

1. In infantile paralysis spasticity of the muscles exists not only in the antagonist of the weakened muscle but also in the weakened muscle itself and

in muscles in parts of the body in which clinical symptoms of the diseases are not evident.

2. The spasticity is of a reflex nature and is not present in the completely paralyzed muscle.

3. The spasticity can be stronger than the voluntary contraction that the muscle is able to perform, as adjudged by action currents.

4. When the strength of the voluntary contraction increases through treatment, the spasticity decreases.

The authors' investigation has shown that spasticity is present in infantile paralysis. Whether the spasticity is actually responsible for weakening of the muscle or whether it is a phenomenon which is merely another consequence of the disease is a question which cannot be answered at the present time.

The After-Care of Amputations

W. R. D. Mitchell, M.Ch., F.R.C.S.Ed. In Practitioner, CXLIX: 890, August 1942.

Exercising.—Active exercising of the stump is started as soon as the wound is healed and free from tenderness. In uncomplicated cases this will usually be about three weeks after amputation. All joints of the stump are put through a full range of supervised active movements for short periods daily. Overtiring of the stump and the production of pain are to be avoided at all stages. Passive stretching will not be necessary if postoperative care has been adequate, but if any deformity has been allowed to develop it may succeed in overcoming slight degrees of hip or knee flexion. Movements at first will not be done against resistance, but later on, as muscle tone improves, the exerciser is of great assistance in promoting further development. When amputations below the knee are concerned special attention should be directed to the quadriceps. In the case of amputations through the thigh, the adductors and extensors of the hip-joint are the most important muscle groups.

The Electrofit in the Treatment of Mental Disease

David J. Impastato, M.D., and Renato Almansi, M.D. In J. Nervous and Mental Dis., 96:4:395. October 1942.

The authors reach the following conclusions:

1) The electrofit therapy as far as is known is a relatively safe form of shock therapy.

2) It has distinct advantages over metrazol and insulin shock therapy.

3) The results obtained are about the same as those obtained by metrazol therapy. In the affective psychoses most authors report 80 per cent of remissions.

4) Under favorable circumstances the treatment can be administrated at the office or in an out-patient department.

5) The apparatus, technic, course of the treatment, indications, manifestations, advantages and complications are discussed.

Discussion on Gonococcal Arthritis and "Rheumatism"

Major G. D. Kersley. In Proc. Royal Soc. Med., XXXV:10:653, August 1942.

Rheumatism associated with gonococcal infection has three striking characteristics, the variety of the manifestations, the difference in duration between time of infection and onset of symptoms and its reaction to hyperpyrexia.

TREATMENT.—Apart from local treatment by heat, counterirritants, massage, rest, etc., the therapeutic field may be subdivided into chemotherapy and hyperpyrexia.

Various preparations of the sulphanilamide group have been used by various technics with some success.

Fever therapy has been used by injecting T.A.B. (10 or more million) intravenously or by the more difficult but far more satisfactory method of hyperthermy.

The combined treatment of sulphanilamide and hyperthermy is still under trial but the results are very promising.

Hench records 10 cases yielding to combined sulphanilamide and hyperthermy treatment but resistant to both when applied separately.

Pelvic short-wave was carried out by means of anteroposterior application of glass electrodes.

Ionization was applied using saline. Where the joint was very painful and swollen the anode was used as the active electrode in order to obtain its analgesic effect on nerve endings and to employ any osmotic dispersal effect on the effusion. Where the condition was more chronic and there was periarticular thickening, the cathode was used as a counterirritant.

Treatment is discussed and where hyperthermy is not available pelvic short wave coupled with local galvanism appears to give the best results. The importance of hyperthermy is borne out by our figures.

Treatment of Rheumatoid Arthritis

C. J. Smyth and R. H. Freyberg, Ann Arbor, Mich. In Amer. J. Med. Sci., April 1942.

Smyth and Freyberg treated 28 patients who had rheumatoid arthritis with different vasodilating drugs administered by carefully controlled iontophoresis; 79 per cent were partially relieved of their articular symptoms during and for a short time after the treatment. However, few patients had significant objective evidence of improvement attributable to iontophoresis. The results from vasodilating drugs administered by iontophoresis when compared with those following other local measures of physical therapy held no advantage. Iontophoresis is a reliable way of producing localized temporary increase in circulation, but it appears to have no important advantage over the less expensive and more accessible commonly employed methods of physical therapy.

The Responsibility of Medical Schools to Teach Physical Therapy

Eben Carey, M. D. In J. A. M. A., 119:3:262, May 16, 1942.

The administrators of medical schools have a tremendous responsibility during these times of World War II. They now face an accelerated program to shorten the medical course from four to three years and demands for hours allocated for certain additional courses. These problems are presented in the face of an overcrowded medical curriculum which includes the present four years of educating medical students. We are faced both with a reevaluation and a reemphasis on basic essentials of teaching methods and of the content of the medical courses. During this period of stress it is not my desire to propose an additional burden but to point out the great need that our graduates have, who were yesterday our students, for practical instruction in the indications and contraindications of physical therapeutic methods.

If physical therapy is to remain under the control of physicians and advance as it should along sound scientific lines, the indifference which the internists as a group have displayed in the past must give way to an active interest in developing a constructive, forward looking policy to improve the practice of and extend education in physical therapy.

As an example of the need of instruction in physical therapy on the part of general practitioners, I may cite the demand for instruction manifested during the last two years at the exhibit on low back pain under the direction of Dr. Frank Ober at the annual meetings of the American Medical Association. A faculty of over fifty demonstrators has exemplified the methods of physical examination of the peripheral nerves and muscles, bones and joint range of motion, as well as simple physical therapeutic procedures of heat, massage, exercise, and passive and active motion. The physician wants this knowledge because of the demands on the part of the public for this agency of relief and the neglect on the part of medical schools to emphasize this modality of treatment to its medical students.

This neglect is manifested in the fact that the most difficult course for the medical administrative officer to organize is the one on physical therapy. Dr. Piersol states that you may comb a great metropolitan center and still find little (organized) material to give students a constructive course along this line. As a nation, faulty posture is one of our outstanding shortcomings noted in draftees. Among those nations in which mass exercise has been in vogue for many years, youths have acquired good posture and are better prepared for military services. He also emphasizes that physical therapy, including those procedures used in heart disease, are adjuncts. Physical therapeutic aids will tend to shorten convalescence and increase the well-being of patients not only physically but also psychologically.

Our duty to medical students and the medical profession will not be fulfilled until each medical school formulates a teaching program in physical therapy. We owe this duty likewise to the public, because physical therapy is part of the art of healing.

Hospitals: Liability for Pneumonia and Tuberculosis Following Hydrotherapy Treatments

From Medicolegal Abstracts, Bureau of Legal Medicine and Legislation. In J. A. M. A., 119:10:830, July 4, 1942.

The plaintiff was suffering from a common cold and entered the defendant sanatorium. She was given hydrotherapy treatments. Subsequently pneumonia and then tuberculosis developed. Attributing these conditions to the negligence of the sanatorium, she brought suit against the institution. The trial court entered judgment against her, whereupon she appealed to the Supreme Court of Colorado.

The plaintiff's complaint alleged that the sanatorium was negligent in giving her "certain hydrotherapy treatments, which treatments consisted of hot baths and hot water treatment, and thereafter failing to take reasonable precautions to observe whether or not the plaintiff was thoroughly dried before placing her in an open and extremely cold hospital room." Assuming, said the Supreme Court, that the hydrotherapy treatment was negligently given, followed by a lack of precautionary measures, there remains the question as to whether the negligence was the proximate cause of the pneumonia and tuberculosis. In order to sustain a charge of negligence as a basis for a legal remedy, the court pointed out, the charge must be fortified by reasonable certainties and not left open to conjecture and speculation. Furthermore, where the record is devoid of any evidence showing a probability of proximate cause, the question is one of law for the court, not of fact for the jury. In this case the court could find no evidence from which the jury could properly have found that the hydrotherapy treatment given by the sanatorium attendant, and other alleged acts of carelessness, were the "cause which in natural and continued sequence, unbroken by an efficient intervening cause, produced" the pneumonia, and subsequently the tuberculosis. The most that could be said from all the evidence, including that of the medical expert who testified for the plaintiff, was that there was a possibility that the treatment may have been the cause. This was not sufficient. The contention that the undisputed medical evidence to the effect that it was *possible* for the exposure to have precipitated the pneumonia was equivalent to *probable* was in the opinion of the court untenable. The judgment in favor of the defendant was therefore affirmed. O'Conner v. Boulder Colorado Sanitarium Ass'n. 111 P. (2nd) 633 (Colo., 1941).

Progress in Internal Medicine: Vascular Diseases: Eighth Annual Review

George W. Scupham, M. D., Geza de Takats, M. D., Theodore R. Van Dellen, M. D., and Philip L. Marcus, M. D., Chicago. In Archives Int. Med. 70:3:444, September 1942.

Horton, Jrusen and Sheard studied the effect of various mechanical devices currently used in the treatment of peripheral vascular diseases on the surface temperature of the toes. Normal subjects, as well as patients with peripheral vascular diseases, were used in their experiments. From their results they concluded that neither the pavaex machine nor apparatus for intermittent venous occlusion is capable of promoting increased blood flow in normal extremities or of value in treating persons with peripheral vascular disease. The best results were obtained by the use of an oscillating bed, provided that this is used in an environmental temperature of 85 to 87 F. (29.5 to 30.5 C), at which level vasospasm ceases to exist. It must be remembered that this evaluation depended solely on the assumption that surface temperature is an index of blood supply.

A similar evaluation of the usefulness of various physical measures in the treatment of peripheral vascular diseases was presented by Wright. Practically all of the therapeutic agents employed at present are mentioned with particular emphasis on their indications and contraindications. No specific data are given on the results obtained, but favorable comment is made on agents producing heat, active vascular exercises, the oscillating bed and iontophoresis employing acetylbetamethylcholine. Wright was not convinced of the value of intermittent venous occlusion and, to a lesser degree, the pressure suction boot.

Interest is being aroused on the question of heat versus cold in the treatment of certain types of peripheral vascular diseases. The previously reviewed work by Allen and his associates on the use of refrigeration as a preliminary to amputation in older patients appears to be gaining favor. Its use in younger persons has recently been suggested by Ochsner, especially in those in whom there is interference with the blood supply as a result of trauma. He suggested that the associated vasospasm be controlled by injection of the sympathetic ganglions with procaine hydrochloride or alcohol. To us the question is not entirely one of controlling the associated vasospasm. It is doubtful if blocking the ganglions will prevent the local action of cold on the vessels anyway. The question is, does collateral circulation develop with the correct amount of refrigeration in these patients or does the cold produce an unchanging condition in the extremity in which neither gangrene nor collateral circulation develops? Many of the details of this form of therapy remain obscure, and consequently more investigation is needed before adoption.

Stein and Weinstein studied the effect of carbon dioxide baths on the peripheral circulation. European authors previously demonstrated that carbon dioxide diffuses through the dermal layers, thus coming into contact with the network of small blood vessels and causing them to dilate. The resultant hyperemia is usually localized to the contact area and is unaccompanied by an appreciable rise in tissue or general metabolism. The authors studied a series of patients submitted to these baths. In all of the subjects the cutaneous temperature increased during the treatment and decreased gradually afterward. When tap water was substituted, the results were similar except that the temperature of the skin fell more rapidly after the completion of the treatment. Capillary studies and blood flow measurements were also made. Blood flow was increased, and in the capillary studies an extraordinarily large number of capillary tufts and loops became visible after exposure. The authors suggest the clinical application of this process but do not report any of their results. One wonders if this is an attempt to resurrect the spa treatments of continental Europe.

Fatherree and Hurst report their observations at Soap Lake, Wash., recently popularized as a spa beneficial to patients with thromboangiitis obliterans. A statistical analysis of 32 patients was made, including not only the usual data but the progress of the disease before and during residence in this area.

Electrical Convulsion Therapy: Clinical Observations

R. E. Hemphill, M. D., Director of Clinical Services at Bristol Mental Hospital. In Lancet, II:VI, August 8, 1942.

Summary and Conclusions

Electrically induced convulsion therapy is a safe and convenient method of physical treatment in mental disorders. It is highly satisfactory in affective reactions and especially in involutional melancholia, but it cannot be regarded as a specific, and to be successful should be accompanied by psychotherapy on general lines. Its value in chronic schizophrenic illness is towards promoting social improvement rather than cure; on recent cases its effect may be much more favorable. No doubt, as others have found, really early treatment brings about a fair percentage of recovery.

There were no immediate fatalities in more than 200 cases of mental disorders treated by electrical convulsion therapy, but unrecognized latent tuberculosis may have been reactivated in 3. Three fractures were seen: of the humerus, the neck of the femur and of the dorsal vertebrae. The only schizophrenics that recovered had been ill for less than a year. Spontaneous remissions were observed in 2 schizophrenics after unsuccessful shock treatment, and prefrontal leucotomy was responsible for improvement in 3 other shock treatment failures.

Psoriasis Vulgaris: Some Therapeutic Considerations

Thomas S. Saunders, M.D., Portland, Oregon. In Northwest Med. 41:4:135, April 1942.

That psoriasis is an incurable disease is universally conceded. However, the greatest disservice a physician can do a psoriatic patient is to advise him that nothing can be done about his condition.

Psoriasis is said to be a disease of "healthy people," and such seems to be the case. Examinations of countless psoriatics have failed to reveal any direct connection with any other disease.

Local Measures

Chrysarobin, used in the treatment of psoriasis since 1878, remains the most effective single therapeutic measure.

Ultraviolet light is a valuable measure in most but not all cases. Seasonal (winter) recurrences seem to respond favorably to its action. The exposure should always be strong enough to provoke a moderate erythema about the lesions. The action of the light is enhanced by preliminary removal of scales and application of tar salves or tar lotions. This (the so-called Goeckerman) treatment is eminently satisfactory in extensive cases and particularly so, if the patient can be hospitalized.

Electric Shock Therapy

Lucie Jessner and V. Gerard Ryan. From Queries and Minor Notes. In J.A.M.A., 119:7:602, June 13, 1942.

To the Editor:—What is your opinion as to the present status of electric shock treatment for mental disorders? I have been consulted as to its value in a man of 50 who has been diagnosed as having general arteriosclerosis and in the last months has shown definite mental deterioration. He exhibits sexual perversions and definite changes in his normal behavior pattern which have necessitated his institutionalization. The institution in which he is confined has advised electric shock therapy. Before rendering judgment on this case I would appreciate your advice in the matter.

Nelson Clark Walker, M.D., Hackensack, N. J.

ANSWER.—The electric shock treatment for mental disorders has largely replaced, in the last year or two, the use of insulin or metrazol to invoke a "shock." This is partly because, by the electrical method, the dosage is easily controlled, a factor long a deterrent in the use of other forms of stimulation. The dose can be graded until the best results are obtained without injury to the patient. Reports from various sources indicate that the effects produced on mental diseases by electric shock are just as good as those from insulin or metrazol. The method, therefore, can be used with a considerable degree of safety if employed by expert hands.

It is more difficult to decide whether a man of 50 with general arteriosclerosis is considered to be a contraindication for any sort of shock treatment; exceptions must always be made, depending on the amount of arteriosclerosis, the condition of the blood pressure, the general health of the patient and the persistence of his mental abnormalities. If arteriosclerosis is causing a permanent and progressive mental degeneration, no form of shock treatment is likely to be efficient. Such an estimation of the patient's condition should be made only after six months of observation in an institution, in the meantime the ordinarily employed forms of psychotherapy being used. If such treatment fails, electric shock should be taken into consideration as a second step.

All these factors must be carefully evaluated. More than one consultant may be needed. In general, one would feel that if the patient is under good institutional care the advice given by the psychiatrist in charge should have the most serious consideration in the final decision.

A review of the various types of shock and an estimation of their efficiency up to 1941 will be found in *Shock Treatment in Psychiatry*, by Lucie Jessner and V. Gerard Ryan, New York, 1941.

Common Colds and Ultraviolet Rays

Queries and Minor Notes. J.A.M.A., 118:17:1525, April 25, 1942.

To the Editor:—A patient has called my attention to the article entitled "Conquering the Common Cold and Other Air Borne Infections" which appeared in the New Republic, Dec. 15, 1941. I should like your opinion as to the value of the new ultraviolet ray lamp mentioned in this article, with particular emphasis on its use in combating the germ of the common cold.

Ben H. Hollis, M.D., Louisville, Ky.

Answer.—William Firth Wells and Mildred Weeks Wells (Am. J. Pub. Health 28:343, March 1938) began work with the installation of ultraviolet ray lamps set up under competent and rigid medical control in order to determine their value in controlling the sanitary quality of the air, with the hope of reducing respiratory disease.

Studies are being conducted at the Henry Phipps Institute in Philadelphia, and at the Cradle Society, Evanston, Ill. (THE JOURNAL, April 11, 1942, p. 1271), which it is hoped will aid in determining the usefulness of ultraviolet rays in sterilizing the air.

Since the virus presumed to be responsible for colds has not been isolated or recognized, definite evidence of the effect of ultraviolet rays in combating colds is not available.

The evidence thus far presented seems to indicate that ultraviolet ray barriers set up between the cribs of infants in nurseries may help prevent the transmission of respiratory infections from one baby to another. Whether the installation of ultraviolet ray lamps in crowded rooms or in the sickroom will aid in preventing the transmission of colds has not been determined.

Hospitals: Liability for Electric Lamp Burn

Medicolegal Abstracts, from Bureau of Legal Medicine and Legislation. J.A.M.A., 119:6:520, June 6, 1942.

The plaintiff was admitted to the defendant hospital one morning preparatory to undergoing an operation. Sometime during the afternoon a hospital attendant attached an electric lamp and reflector to the bedstead at the foot of the plaintiff's bed. The lamp was attached by means of hooks similar to the ear bows of eye glasses. The operation was performed about 8 o'clock in the evening under a spinal anesthetic, and the plaintiff was returned to his room an hour or so later. In the middle of the night the plaintiff complained of a burning sensation in his feet. When the bed clothes were removed a nurse discovered the lamp which had formerly been attached to the foot of the bed. The plaintiff's foot had been seriously burned. Subsequently the plaintiff sued the defendant hospital for damages on negligence of the defendant's servants. The trial court refused to submit the case to the jury and dismissed the plaintiff's complaint, so the plaintiff appealed to the Court of Appeals of New York.

The defendant contended that the trial court ruled correctly in dismissing the complaint because the plaintiff had not produced sufficient evidence to warrant the submission of the case to the jury. It argued that the plaintiff had not negatived the possibility that the burn was caused by his own negligence or that of some one for whose actions the defendant hospital was not responsible. It also insisted that there was no proof that the burns were caused by the lamp. The Court of Appeals said that circumstantial evidence was sufficient if it supported the inference of causation, even though it did not negative the existence of a remote possibility that the injury was not caused by the defendant. The plaintiff's evidence, said the court, was sufficient, if believed, to show that the plaintiff was not burned when he was put to bed after the operation; that he felt the burn later, that the lamp was removed from under the bed clothes and that the burn was of the kind which could be caused by the lamp in question. Furthermore, said the court, it was unreasonable to assume that some complete stranger, or even the plaintiff's physician, entered the plaintiff's room during the operation and tampered with the bed lamp. The court therefore concluded that the plaintiff's evidence negatived all but the barest possibility that the defendant was free from negligence and held that the case should have been submitted to the jury. The court also held, although the defendant claimed no immunity because of its charitable nature, that it is now well settled in New York that even a charitable hospital is liable for the acts of its servants. Judgment for the defendant was accordingly reversed and a new trial granted.

Electrocution by Home Treatment Device

Richard Kovacs, M.D., New York. J.A.M.A., 119:6: 498, June 6, 1942.

"Electric Shock Kills Pastor" was the caption of a story in the New York *Times* of Feb. 20, 1942. The Rev. L. G. W. of a Long Island Universalist was found dead in his room the night before. According to information obtained from the office of the chief medical examiner of Nassau County he was found lying on the floor of his bedroom, fully clothed except for his coat. A metal electrode was on the back of his neck, slipped under the collar and held in place with a scarf. A wire led from the electrode to the radiator and was wired to the radiator. A rheostat was plugged in a wall socket, the handle of a "violet ray" machine was on the deceased's chest and a circular hollow piece of metal was in his left hand, as illustrated in the accompanying sketch.

The object lesson of this tragic happening is obvious. Any sort of self treatment by electric devices —home made or procured from unscrupulous manufacturers or their sales agents—may cause death by electrocution when applied by inexperienced and unskilled lay persons.

Sodium Sulfathiazole Iontophoresis

James L. Boyd, M.D., New York. In Arch. Ophthal. 28:2:205, August 1942.

The author reaches the following conclusions about this method:

1. Iontophoresis of a 5 per cent solution of sodium sulfathiazole with a low current (1 milliampere) for but a short time (two minutes) when compared with use of a corneal bath of equal duration increases the sulfathiazole concentration of the cornea and of the aqueous humor by three times. With a current of 2 milliamperes the concentration in the cornea and in the aqueous humor is ten and nine times, respectively.

2. Sulfathiazole concentrations varied directly but not proportionately with the strength of current and the time of application.

3. No ocular damage was observed with use of a current that produces a satisfactory sulfathiazole concentration in the cornea and in the aqueous humor—i.e. a concentration consistent with optimal bacteriostatic effect.

The Kenny Treatment of Infantile Paralysis in the Acute Stage

James E. Dyson, M.D., Des Moines. In J.Iowa State Med. Soc., 32:7:297, July 1942.

Conclusions

The author believes Miss Kenny has given us a new concept of the treatment of the symptoms of poliomyelitis in the acute stage. It relieves pain and muscle spasm. It maintains muscle function, joint function and tends to prevent deformities. It maintains and even reestablishes neuromuscular pathways. The author believes it will considerably lessen the percentage of permanent paralysis and deformity.

Scalenus Anticus Syndrome or Cervical Foraminal Compression?

I. William Nachlas, M.D., Baltimore. In Southern Med. J., 35:7:663, July 1942.

1. The syndrome of pains radiating to the shoulder and adjacent areas, for which the name "brachialgia" is suggested, is not a disease entity but is the result of inflammation or pressure on the nerves in the cervical region.

The scalenus anticus muscle is not primarily responsible for the pressure phenomena, and scaleniotomy is not etiologic treatment.

The symptom complex is frequently observed, and usually can be associated with lesions of the cervical spine that produce intervertebral foraminal compression of the nerve roots.

2. Treatment should be directed to the correction of the etiologic factor but, in addition to this, an effort should be made to relieve the pressure on the nerves at the cervical foramina. Since hyperextension of the neck opens these spaces, mechanical devices that can do this should be considered. Postural treatment in bed, strapping the neck in hyperextension and the Thomas collar are all useful. Physical therapy is quite helpful. In resistant cases the use of head traction is particularly valuable. After the acute stage is over education of the patient to proper posture with muscle training and rehabilitation are indicated.

Minimizing the After Effects of Acute Poliomyelitis: A Rationalization of the Kenny Treatment

Philip Moen Stimson, M. D., New York. In J. A. M. A., 119:13:989, July 25, 1942.

The causes of the more obvious spasm, that apparently involving an entire muscle or the greater part of it, are not clear. There are many theories at present, involving reflex action, irritation, circulation, inflammation and anoxia, which do not need to be gone into at this time. But whatever the cause, spasm certainly is constantly present in early poliomyelitis, being found in the muscles of the neck and the back, and in the hamstrings as well as in a variable number of other groups of muscles. It is found both in muscles most of whose motor neurons are definitely weakened or paralyzed and in those without any evidence of weakness.

Spasm causes dysfunction not only of the muscle that is in spasm but also of its antagonist, which may be overstretched and rendered noncontractile. For instance, spasm of the biceps affects the use not only of the biceps itself but also of the triceps.

Spasm is aggravated by pain and tenderness, by attempts at active motion, by forced immobilization as by casts and splints, also considerably by massage and by electrical stimulation. If untreated, muscle fibers in spasm may become hard and inelastic and may comprise the bulk of a muscle; eventually, some may show fatty replacement, others fibrous degeneration. Hipps also described "stretch tears," or minute ruptures of bundles of muscle fibers due to the force of a slow, continued stretch. If spasm is allowed to persist, permanent contracture and further loss of function ensue.

A most important part of the treatment of an early acute case of poliomyelitis is management of the morale. There are few illnesses which so greatly shake the courage of a patient's parents, and sometimes of the patient himself, as does poliomyelitis. With patients on the Kenny treatment, the maintenance of morale is easier than in former years, because—the patients are more comfortable and are more hopeful from the start; but there are bound to be those destined to be left with limitations, despite the best care.

Observations on the Kenny Treatment of Poliomyelitis

F. H. Krusen, M.D. In Proc. Staff Meetings Mayo Clinic, 17:29:449, August 12, 1942.

The Kenny technic is not universally accepted, partly because as yet it has not been widely presented and partly because it is difficult for the average physician, unless he has had an opportunity to see actual demonstrations over some period of time, to swallow the almost wholly new concept of the pathologic physiology of poliomyeltis which this group has advanced. This concept is not new in its entirety because, for example, Toomey wrote recently that in poliomyelitis, "most of the pain is not cutaneous but in the muscle. Normal muscle tissue is insensible to touch unless touch sends it into some degree of spasm as in cramping." Toomey said that there is an immediate "setting" or hardening of the muscles and that if this "setting" can be prevented or overcome at the outset, it will be unnecessary later to break down adhesions or to use manipulation. It is likely Toomey was groping toward somewhat the same ideas as the Minneapolis group.

The tremendous enthusiasm for the Kenny procedure seems to a large degree warranted, although it appears evident that some of the claims concerning it are too enthusiastic. In the recent literature, the Kenny protagonists have mentioned repeatedly that they have seen "absolutely no deformities" following the use of the procedure. This is misleading, because some of these patients do have flail extremities after the Kenny treatment and some of them walk with a Trendelenburg limp. These are certainly deformities. What the observers meant to say, I believe, is that they have seen absolutely no contractures, malalignments or spinal curvatures attributable to contractures following this treatment. In this observation, I am willing to concur. I have seen no spinal curvatures in any of the fifty-four cases which have been under the care of Dr. Pohl at the Minneapolis General Hospital for the past two years. This alone indicates a distinct improvement over the usual methods of treatment.

Modern Concepts in the Treatment of Bronchial Asthma

Henry D. Ogden, M.D., New Orleans. In New Orleans Med. and Surg. J., 94:10:490, April 1942.

Hyde has recently reported good results with rather mild fever therapy, using a humidified external heating type of cabinet. He reports improvements in 75 per cent of his cases. His results seem to be better than when longer and higher fevers are used.

The Need for Trained Personnel in Army Departments of Physical Therapy

Frank H. Krusen. Editorials. In Surgery, Gynecology and Obstetrics, 74:6:1160, June 1942.

In the modern military hospital the department of physical therapy plans an important part. Traumatic lesions commonly encountered in military practice often require physical treatment during the stage of rehabilitation.

At the present time there is an extreme shortage, not only of physical therapy physicians but also of physical therapy technicians (physical therapy aides).

Plans have been developed for the training of a certain number of medical officers to conduct military physical therapy departments, and a number of schools for physical therapy technicians are in existence. The great need at the moment is to obtain a sufficient number of qualified students for both courses. The Surgeon General's Office is now assigning active and reserve medical officers interested in the subject of physical medicine for special training in the field.

Occupational Therapy

Elizabeth Casson, M. D., D. P. M., Medical Director, Dorset House School of Occupational Therapy, Barnsley Hall, Bromsgrove, Worcs. In Practitioner, CXLIX: 890:89, August 1942.

Ancillary services fall naturally into two groups; first, those processes in which the patient is passive and submits to various forms of treatment—to operation by a surgeon, to being washed and fed by nurses, to receiving massage, passive movement, or electrical stimulation; and, secondly, the part the patient plays in his own cure, stimulated and guided as the medical officer may direct.

The whole of occupational therapy rests upon the fact that the patient occupies himself. It is a form of "behavior", and therefore it is a muscular expression of emotions that arise from stimuli to the patient's mind. In this dividing treatment into active and passive, it is evident that a sharp division cannot be made.

War conditions are emphasizing the surgical aspects of occupational therapy, and it is therefore becoming better organized than in the case of medical illness. The routine practice is to prescribe it with strict instructions as to what movements are to be undertaken. It is for the occupational therapist to provide the crafts, joinery or games that are needed. To get the best results certain conditions must never be forgotten. The patient must want to occupy himself; therefore the occupational therapist must be capable of stimulating the patient's interest. It is as necessary to arouse enough emotion to provide a motive as it is to put petrol into the tank of a motor, and the occupational therapist must know how to arouse that emotion. She must know enough psychology (that is, the knowledge of how human beings behave) to be able to judge how any individual will respond.

When once in the workshop it is most important for work to be graduated until the patient is doing a full day's work.

There is a large place for occupational therapy among out-patients. Not only should the curative workshop open its doors daily to all for whom it is prescribed, but patients who come up for daily dressings can be kept from sliding into invalidism by careful stimulation, both for helping recovery of the disability, and also for keeping up muscular tone and habit of exercise in other parts of the body. The resident patient passes through the stages of occupational therapy in bed, of crafts and joinery in the curative workshop while still in the hospital, but there are great advantages in having a workshop elsewhere, for this approximates better to "going to work" in the first stage. Such a workshop should be open to any cases of illness or injury living at home for whom attendance is prescribed.

The Soldier's Foot

Editorial. In Lancet, II:XI, September 12, 1942.

Pain in the feet is one of the commonest symptoms confronting the regimental medical officer, and, as an official bulletin puts it, it is his duty to keep good feet symptom-free rather than render those with gross deformities fit for service. The most that can be demanded of the soldier's foot is that it should be supple, painless, of adequate musculature and free from gross deformity; when these qualities are present minor degrees of hallux valgus, hallux rigidus, pes planus and cavus need not remove their owners from the A-1 category.

Reeducation is particularly required for the valgus foot with clawing due to incoordinated extensor action already mentioned; and once these patients have relearned the use of their intrinsics and to dissociate dorsiflexion from extension of the toes they are well on the way to recovery. The main lesson to be drawn from a study of the large amount of material provided by the war is that the painful foot is a major disability which usually requires hospital treatment; incomplete outpatient supervision leads too often to a vicious circle of recurrent pain and stiffness. Preliminary bed-rest is necessary for the majority, and individual attention from the physical therapist should precede participation in the general foot-class. In few other disabilities is the end-result affected so largely by the patient's willingness to cooperate and general morale, and a preliminary report by the RMO on the man's character assists in deciding between palliative and radical treatment, or whether regrading is necessary.

Book Reviews

THE 1942 YEAR BOOK OF PHYSICAL THERAPY. Edited by Richard Kovacs, M.D., Professor and Director of Physical Therapy, New York Polyclinic Medical School and Hospital; Attending Physical Therapist, Manhattan State, Harlem Valley State and West Side Hospitals; Visiting Physical Therapist, New York City Department of Correction Hospitals; Consulting Physical Therapist, New York Infirmary for Women and Children; Mary Immaculate Hospital, Jamaica, New York; Hackensack Hospital, Hackensack, New Jersey. Cloth. Price, $3. Pp. 416, with 126 illustrations. Chicago: The Year Book Publishers, 1942.

This is a progress volume of the literature of 1941 and the early part of 1942 in the field of physical therapy. It should be in the library of every physical therapy technician and of every physician interested in physical therapy.

It is divided into two parts: physical therapy methods and applied physical therapy. In the field of hypothermy further studies are reported on the physiologic effects of cold and the new refrigeration method for amputating limbs. The use of local hypothermy in gynecological and dermatologic conditions is noted. Artificial ultraviolet irradiation increased its scope of application for air sterilization and is now being used not only in the operating room but also for the control of cross infections in hospital wards. These lamps were accepted by the Council on Physical Therapy of the American Medical Association. Improvement and modification of electrosurgical apparatus is reported. The use of faradic shock therapy is shown as a standard method of treatment for certain types of depressive mental conditions and its apparent success in the treatment of delirium tremens is reported.

Physical education, fitness and rehabilitation have received increased interest. The role of spas is stressed. The use of physical therapy in chronic arthritis, painful shoulder and low back conditions is reported. Several papers on the use of the Kenny treatment of infantile paralysis are reviewed. Physical treatment of peripheral nerve injuries and spastic paralysis and the use of electrical and other aids in their diagnosis and prognosis received extensive studies. These and many other advances are reported in the 1942 Year Book of Physical Therapy.

WAR GASES: THEIR IDENTIFICATION AND DECONTAMINATION. By Morris B. Jacobs, Ph. D., Food, Drug and Insecticide Admin., U. S. Dept. of Agr., 1927; Chemist, Dept. of Health, City of New York, 1928; formerly Lt. U. S. Chemical Warfare Service Reserve. Cloth. Price, $3. Pp. 180. New York: Interscience Publishers, Inc., 1942.

One of the first steps in the defense against poison gas is the detection, sampling, the identification of the chemical agent, and the decontamination of areas and materials polluted by them. This book presents these subjects, giving information that will be useful to the gas identification officer, the war gas chemist, the decontamination officer and the health officer.

The following subjects are considered: classification of the chemical agents; the physical characteristics and physiological response of the war gases; effects of war gases on materials, water and food; sampling; scheme of analysis; detection and determination of arsenic; confirmatory tests, and decontamination.

The Geneva General Gas Protocol of 1925, which most of the countries of Europe signed, forbids the use of poison gas in war. Some of our enemies in World War II have already used gas. Complacency about the use of gas by our enemies is dangerous and is to be deplored. Such attacks, launched against an unprepared people, might be extremely serious.

Poison gas is dangerous, but it is not so dangerous, however, that we cannot protect ourselves against it. Mustard gas was, and probably is, the most efficient chemical warfare agent known. Yet it took one ton of mustard to cause 30 casualties in World War I and only one of these casualties was fatal. In order that we may know how to evaluate the danger from poison gases and the means of protection against them, we must learn about their physical, chemical and physiological properties. This volume furnishes such information and can be recommended to gas officers and those in the medical services of civilian defense.

MEDICAL MANUAL OF CHEMICAL WARFARE. Reprinted by Permission of the Controller of His Britannic Majesty's Stationery Office. First American Edition. Cloth. Price, $2.50. Pp. 119. Brooklyn, N.Y.: Chemical Publishing Company, Inc., 1941.

This manual is prepared for the use of physicians in the Emergency Medical Services of Civilian Defense. There always is a possibility in modern warfare that chemical agents may be used against unprotected civilian populations. Information on the prevention and treatment of casualties from these agents should be disseminated widely so that the population may be properly protected. The Medical Division, Office of Civilian Defense, Washington, D. C., has issued a pamphlet of "First Aid in the Prevention and Treatment of Chemical Casualties."

This volume presents briefly but in considerable more detail than the First Aid booklet the effects of chemical warfare substances and the methods that should be adopted to minimize them. As every physician in our country should be in the armed forces or connected with civilian defense, this book should be read by every physician.

MEDICAL APPLICATIONS OF THE SHORT WAVE CURRENT. By William Bierman, M.D., Attending Physical Therapist, Mount Sinai Hospital, New York City, Assistant Clinical Professor of Therapeutics, New York University College of Medicine. Chapter on Physical and Technical Aspects by Myron M. Schwarzschild, M.A., Physicist, Beth Israel Hospital, New York City, Instructor of Physics in Radiology, New York University College of Medicine. Second Edition. Cloth. Price, $5. *Pp.* 344, *with 87 illustrations. Baltimore: The Williams and Wilkins Company,* 1942.

This book includes a chapter on the physics of the short wave current, its physiological effects and the clinical uses of this current. In this edition much of the recent literature on the subject has been reviewed and added to the data contained in the original volume. The character of the illustrations have been changed and new ones have been added which makes the technics clearer. A new chapter has been added on fever therapy.

The short wave current is widely used, and the apparatus which produces this form of energy is now found in a large percentage of the hospitals and in many physicians' offices. The laity, through the extensive publicity on the radio and through friends, have begun to use this apparatus for self treatment. The unwarranted claims made by some companies that sell such apparatus and the harm produced by self-diagnosis and self-treatment may reflect badly upon the entire field. Proper steps are being taken by the Federal Communications Commission and the War Production Board to stop this evil.

The chief function of this book is to teach the correct use of the short wave diathermy machines now in hospitals and in physicians' offices. Those who are interested in this subject will find this monograph invaluable.

ESSENTIALS OF PATHOLOGY. By Lawrence W. Smith, M.D., Professor of Pathology, Temple University School of Medicine, Philadelphia, and Edwin S. Gault, M.D., Associate Professor of Pathology, Temple University School of Medicine. With a forward by James Ewing, M.D. Second edition. Fabrikoid. Price, $10. *Pp.* 904, *with 679 illustrations, including 13 color plates. New York & London: D. Appleton-Century Company, Inc.,* 1942.

Ewing in his foreword says: "Various devices have been employed to take the teaching of pathology out of the realm of abstract philosophy and make it an effective force in the professional equipment of the medical student. None of these devices has proven so efficient as the study of case reports interpreted in the light of gross pathological data and analyzed by the methods of histopathology." The authors have presented such a textbook.

Each subject is presented with a practical, general discussion which is followed by carefully selected illustrative case histories, complete with their associated gross and microscopic pathology. To assist the student in visualizing the underlying alterations in form and function, the pictorial method is employed most extensively. A number of roentgenograms and gross pathological pictures are given to correlate the appearance of the lesions with the microscopic histology.

In this edition the first thirteen chapters on general pathology have been completely rewritten to include a rather full discussion of pathologic principles and the mechanism thereof as well as the more objective gross and microscopic detail. The case histories have been condensed to conserve space, and some new illustrations have been added. This volume can be highly recommended as a practical textbook of pathology which correlates the underlying pathologic processes with the visible evidences of disease.

ANATOMY OF THE HUMAN BODY. By Henry Gray, F.R.S., Late Fellow of the Royal College of Surgeons; Lecturer on Anatomy at St. George's Hospital Medical School, London. Edited by Warren H. Lewis, B.S., M.D., Member the Wistar Institute of Anatomy and Biology, Philadelphia, Pennsylvania. Twenty-forth Edition. Cloth. Price, $12. *Pp.* 1428, *with* 1256 *engravings. Philadelphia: Lea & Febiger,* 1942.

Gray's "Anatomy" has been a standard textbook for over three-quarters of a century. There is no other book in medicine with this record. This twenty-fourth edition is thoroughly revised and the editor has had the assistance of a staff of distinguished anatomists. These editors have presented the latest information in their fields.

The"Ductless Glands" is presented by Earl T. Engle, Ph. D., Professor of Anatomy, Columbia University College of Physicians and Surgeons; "The Peripheral Nervous System and the Autonomic Nervous System" by Joseph C. Hinsey, Ph. D., Professor of Anatomy, Cornell University Medical College; "The Blood Vascular System" by Normand L. Hoerr, Ph. D., M. D., Professor of Anatomy, Western Reserve University; "The Respiratory and Digestive Systems" by Karl E. Mason, Ph. D., Professor of Anatomy, University of Rochester; "The Central Nervous System" by David McK. Rioch, M. D., Professor of Neurology, Washington University, and "The Urogenital Systems" by Roy G. Williams, M. D., Associate Professor of Anatomy, University of Pennsylvania.

In 1858 Henry Gray published the first edition of his "Anatomy." The great success of this work since this time has been due to its effectiveness as a textbook for medical students and its practical value to physicians as a reference book. This edition has the same effectiveness. The test is practical. The volume is durable and convenient for everyday use. It can be highly recommended to all students of human anatomy.

THE MANAGEMENT OF FRACTURES, DISLOCATIONS AND SPRAINS. By John Albert Key, B.S., M.D., Clinical Professor of Orthopedic Surgery, Washington University School of Medicine; Associate Surgeon, Barnes, Children's and Jewish Hospitals, St. Louis, Mo.; and H. Earle Conwell, M.D., F.A.C.S., Orthopedic Surgeon to the Tennessee Coal, Iron and Railroad Company and the Orthopedic and Traumatic Services of the Employees' Hospital and to the American Cast Iron Pipe Company; Chairman of the Committee on Fractures and Traumatic Surgery of the American Academy of Orthopaedic Surgeons; Member of the Fracture Committee of the American College of Surgeons; Associate Surgical Director of the Crippled Children's Hospital; Attending Orthopedic Surgeon to St. Vincent's Hospital, South Highlands Hospital, Hillman Hospital, Children's Hospital, Baptist Hospitals and Jefferson Hospital, Birmingham, Ala. Third Edition. Cloth. Price $12.50. *Pp.* 1301, *with* 1259 *illustrations. St. Louis: C. V. Mosby Company,* 1942.

This volume gives the forms of treatment used for fractures, dislocations and sprains by two surgeons with a large experience in the field of traumatic surgery. The physician in the smallest town, due to automobile accidents and the tremendous expansion of war industrial accidents, may have to treat severe fractures. He should know the best form of emergency treatment, the subsequent treatment at home, the best method for transporting the case to a hospital if this is necessary and when to procure the opinion and aid of a specialist.

The authors believe that fractures of the skull and face require the attention of specialists. Therefore, the late Dr. Charles E. Dowman wrote the chapter on "Fractures of the Skull and Brain Trauma" and his associate, Dr. Edgar F. Fincher, has revised it for this edition. Dr. James Barrett Brown of St. Louis wrote the chapter on "Fractures of the Jaws and Related Bones of the Face" and revised it for this edition.

In this edition the most extensive changes have been made in the sections devoted to fractures of the spine, humerus, hip and foot. The chapter on compound fractures has been rewritten, largely as the result of the introduction of the sulfonamides in the treatment of these injuries. A new section on war injuries has been added.

The specific directions for fracture treatment, the excellent illustrations, and the detailed information on after-treatment make this a book that should be in the library of every physician. It should be most useful to industrial surgeons.

WAR MEDICINE: A SYMPOSIUM. Edited by Winfield Scott Pugh, M.D., Commander (M.C.) U.S.N. Retired; formerly Surgeon, City Hospital, New York; Associate Editor, Edward Podolsky, M.D.; Technical Editor, Dagobert D. Runes, Ph.D. Cloth. Price, $7.50. *Pp.* 565, *with illustrations. New York: Philosophical Library,* 1942.

Since World War I many important changes have occurred in the duties and functions of the military surgeon and in the treatment of war injuries. This symposium presents some of the best military medical opinions of the United States and Great Britain. There are three sections: surgery, aviation and naval medicine, and general medicine.

The first section considers the effects and treatment of wounds and injuries to the various parts of the body. The treatment is considered in relation to the fact that it must be given under pressure during times of stress and emergency. It shows that wounds, injuries and shock are the immediate problems in the field.

The many problems of aviation medicine are thoroughly considered in the second part with an introduction on aviation medicine in the navy by Rear Admiral Ross T. McIntire, Surgeon General of the Navy. The medical problems of war medicine in the third section are discussed in a practical manner by cardiologists, psychiatrists, allergists and other specialists. This volume can be read with profit by physicians entering the armed services for duty during this war.

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Under the direction of John S. Coulter, M. D., Associate Professor of Physical Therapy, and Miss Gertrude Beard, R. N.

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